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CONTENTS

ANNE ANASTASI AND JOHN P. FOLEY, JR. An Analysis of Spontaneous Drawings by Children in Different Cultures 689

GARRET L. BERGEN. Some Observations on Large-Scale Testing 249

W. H. BRENTLINGER. The Abilities and Occupational History of Transients: A Preliminary Study 105

W. H. BRENTLINGER. The Emotional Stability of the Transient 193

MOSHE BRILL. Measuring Institutional Adjustment of Mentally Deficient Boys 736

LAURA MAE BROWN: See Hartkemeier and Brown.

ROBERTA W. BROWN. The Relation between Age (Chronological and Mental) and Rate of Piano Learning 511

EMILY T. BURR: See Metcalfe and Burr.

C. E. BUXTON: See Humphreys, Buxton and Taylor.

ALAN CANTY. A Note Concerning the Examination of Traffic Offenders 493

J. SPENCER CARLSON, STUART W. COOK AND ELEROY L. STROMBURG. Sex Differences in Conversation 727

C. M. CHARLES. A Comparison of the Intelligence Quotients of Incarcerated Delinquent White and American Negro Boys and and of Groups of St. Louis Public School Boys 499

CLIFFORD B. CONWAY. A New Scoring Device for the Bernreuter Personality Inventory 264

STUART W. COOK: See Carlson, Cook and Stromburg.

CHARLES L. COOPER. Mechanical Aptitude and School Achievement of Negro Boys 751

HERMAN A. COPELAND. Some Characteristics of Three Tests Used to Predict Clerical Success 461

S. L. CRAWLEY. Transfer of Religious Affiliation among Urban Negroes 93

BLAKE CRIDER. The Identification of Emotions in Advertising Illustrations 748

NOEL B. CUFF. Scoring Intelligence Tests by Weight 769

R. C. DAVIS. The Effect of Analgesic Dosage of Aspirin (Acetyl Salicylic Acid) on Some Mental and Motor Performances 481

GRAHAM B. DIMMICK. Differential Interests of Engineering Graduates 221

C. M. DISERENS AND T. W. WOOD. The Prevalence of Belief in Fortune Telling among College Students 488

EDGAR A. DOLL. Idiot, Imbecile, and Moron 427

EARLE E. EMME. The Adjustment Problem of College Freshmen and Contributory Factors 60

JOHN P. FOLEY, JR.: See Anastasi and Foley.
HAROLD V. GASKILL AND RICHARD L. HOLCOMB. The Effectiveness of Appeal in Radio Advertising: A Technique with Some Typical Results 325
J. R. GERBERICH AND J. A. THALHEIMER. Reader Interests in Various Types of Newspaper Content 471
JEANNE G. GILBERT. Senescent Efficiency and Employability 266
BRUCE D. GREENSHIELDS. Reaction Time in Automobile Driving 353
C. H. GRIFFITTS. The Relation between Anthropometric Measures and Manual Dexterity 227
J. P. GUILFORD: See Hackman and Guilford.
R. B. HACKMAN AND J. P. GUILFORD. A Study of the Visual Fixation Method of Measuring Attention Value 44
HARRY PELLE HARTKEMEIER AND LAURA MAE BROWN. Multiple Correlation and the Multiple Factor Method 396
GEORGE W. HARTMANN. The Relative Social Prestige of Representative Medical Specialities 659
RICHARD L. HOLCOMB: See GASKILL AND HOLCOMB.
LLOYD G. HUMPHREYS, C. E. BUXTON AND H. R. TAYLOR. Steadiness and Rifle Marksmanship 680
RICHARD W. HUSBAND. In Defense of Scientific Vocational Guidance 586
E. T. KATZOFF: See Stagner and Katzoff.
ELAINE F. KINDER: See Taft and Kinder.
CLIFFORD KIRKPATRICK. Inconsistency in Attitudinal Behavior with Special Reference to Attitudes toward Feminism 535
FRANKLIN H. KNOWER. Experimental Study of Changes in Attitude: Some Incidence of Attitude Changes 114
HARVEY C. LEHMAN. Hazards Encountered when Attempting to Equate Fraternity and Non-Fraternity Students 451
HARVEY C. LEHMAN AND PAUL A. WITTY. Sex Differences in Vocational Attitudes 576
RENSIS LIKERT. A Method for Measuring the Sales Influence of a Radio Program 175
EDWARD A. LINCOLN. Stanford Binet IQ Changes in the Harvard Growth Study 236
HENRY C. LINK. A Test of Four Personality Traits of Adolescents 527
HOWARD P. LONGSTAFF. Effectiveness of Children's Radio Programs 208
HOWARD P. LONGSTAFF. Preliminary Results of a Study of Mothers' Opinions of Children's Radio Programs 416
HOWARD P. LONGSTAFF. Trade Name Hurdles 438
IRVING LORGE. A Table of Percentile Equivalents for Eight Intelligence Tests Frequently Used with Adults 392
HARRY C. MAHAN AND LOUISE WITMER. A Note on the Stanford-Binet Vocabulary Test 258

I. L. MAIZLISH. New Possibilities in Intelligence Testing: Interview Form 599
ZAIDA METCALFE AND EMILY T. BURR. A Practical Form of the Girls Mechanical Assembly Test 672
CLELLAN L. MORGAN. An Experiment with a Special Class of Superior Undergraduate Students 146
WILLARD C. OLSON. The Waiver of Signature in Personal Reports 442
HELEN PALLISTER. American Psychologists Judge Fifty-three Vocational Tests 761
DONALD G. PATERSON AND MILES A. TINKER. Studies of Typographical Factors Influencing Speed of Reading: XII. Printing Surface 128
DONALD G. PATERSON: See Tinker and Paterson.
LEIGH PECK. An Experiment with Drawing in Relation to the Prediction of School Success 16
LOUISE E. POULL. Psychographic Method of Clinical Practice 161
H. H. REMMERS AND J. M. SMITH. Reliability and Practice Effect in the O'Connor Wiggly Block Test 591
MARY M. ROOS. Sampling Theory as Used in the Determination of Psychological Trends in Volume Mail 368
AVNER SCHILLER. Theories of Handedness, Part III 77
RICHARD S. SCHULTZ. Standardized Tests and Statistical Procedures in Selection of Life Insurance Sales Personnel 553
ANNIE BELL SIBLEY AND EMILY L. STOGDILL. The Abstracting of Clinical Re-Education Techniques as a Method of Training Beginners in Clinical Psychology 609
FRANCIS F. SMITH. The Relation between Objectivity and Validity in the Arrangement of Items in Rank Order 154
J. M. SMITH: See Remmers and Smith.
MAPHEUS SMITH. Rural and Urban Origins of Members of the American Congress 664
ROSS STAGNER AND E. T. KATZOFF. Personality as Related to Birth Order and Family Size 340
DANIEL STARCH. An Evaluation of Principles of Behavior 183
EMILY L. STOGDILL: See Sibley and Stogdill.
RALPH M. STOGDILL. The Measurement of Attitudes toward Parental Control and the Social Adjustments of Children 359
ELEROY L. STROMBURG: See Carlson, Cook and Stromburg.
GEORGIANA C. TAFT AND ELAINE F. KINDER. An Analysis of Capacities for Performance of Mental Defectives Skilled in Lace-Making 567
H. R. TAYLOR: See Humphreys, Buxton and Taylor.
JAMES H. TAYLOR. The Relationship between Finger Length, Hand Width, and Musical Ability 347

J. A. THALHEIMER: See Gerberich and Thalheimer.
GEORGE N. THOMPSON. Blood Type as Related to Intelligence, Emotions, and Personality 785
EDWARD L. THORNDIKE. The Value of Reported Likes and Dislikes for Various Experiences and Activities as Indications of Personal Traits 285
LOUIS P. THORPE. The Orchestral Type Preferences of Students 778
MILES A. TINKER AND DONALD G. PATERSON. Studies of Typographical Factors Influencing Speed of Reading: XIII. Methodological Considerations 132
MILES A. TINKER: See Paterson and Tinker.
W. L. VALENTINE. Common Misconceptions of College Students 633
JAMES VAUGHN. An Experimental Study of Competition 1
E. G. WILLIAMSON. The Rôle of Faculty Counseling in Scholastic Motivation 314
JOHN E. WINTER. Comparison of the Cardio-Pneumo-Psychograph and Association Method in the Detection of Lying 243
LOUISE WITMER: See Mahan and Witmer.
PAUL A. WITTY: See Lehman and Witty.
T. W. WOOD: See Diserens and Wood.

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TABLE OF CONTENTS

W. L. VALENTINE. Common Misconceptions of College Students 633

GEORGE W. HARTMANN. The Relative Social Prestige of Representative Medical Specialties 659

MAPHEUS SMITH. Rural and Urban Origins of Members of the American Congress 664

ZAIDA METCALFE AND EMILY T. BURR. A Practical Form of the Girls Mechanical Assembly Test 672

LLOYD G. HUMPHREYS, C. E. BUXTON AND H. R. TAYLOR. Steadiness and Rifle Markmanship 680

ANNE ANASTASI AND JOHN P. FOLEY, JR. An Analysis of Spontaneous Drawings by Children in Different Cultures 689

J. SPENCER CARLSON, STUART W. COOK, AND ELEROY L. STROMBURG. Sex Differences in Conversation 727

MOSHE BRILL. Measuring Institutional Adjustment of Mentally Deficient Boys 736

BLAKE CRIDER. The Identification of Emotions in Advertising Illustrations 748

CHARLES L. COOPER. Mechanical Aptitude and School Achievement of Negro Boys 751

HELEN PALLISTER. American Psychologists Judge Fifty-three Vocational Tests 761

NOEL B. CUFF. Scoring Intelligence Tests by Weight 769

LOUIS P. THORPE. The Orchestral Type Preferences of Students 778

GEORGE N. THOMPSON. Blood Type as Related to Intelligence, Emotions, and Personality 785

NEWS AND NOTES 790

BOOK REVIEWS 793

NEW BOOKS AND PAMPHLETS 797

INDEXES 799

COMMON MISCONCEPTIONS OF COLLEGE STUDENTS[1]

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PART I

THE purpose of this investigation is to make observation on the incidence of certain popular misconceptions regarding psychology and allied fields in the credo of the typical student who registers for a course in general psychology. Its importance is dependent upon the enthusiasm with which one accepts the notion that psychology should be more meaningful than it now is in the daily lives of the students who are registered for it. There have been several previous surveys upon which our work is based. Nixon (8) in 1926 gave a list of 30 items, including some superstitions and some psychological misconceptions of the type,

> Intelligence can be increased by training.
> The number of man's senses is five.
> Women are inferior to men in intelligence.

to a group of 219 men and 140 women in beginning psychology classes. But since evening-school students made up the majority of the group, he was of the opinion that it was more mature than the typical college student group.

Garrett and Fisher (6) elaborated Nixon's list and administered it to 100 boys and 100 girls, whose median age was 17, in two New York City High Schools. The items that are common to both lists (Table 1) indicate a distinctly more psychologically conventional attitude in the older students. But almost 80 per cent of both men and women in Nixon's group thought that "intelligence could be increased by training."

[1] The author acknowledges the assignment to him of several tabulators made available by F.E.R.A. funds, without which it would not have been possible to complete this survey.

TABLE 1

The Percent of the Populations, Involved in Three Studies, Who Held the Misconceptions Indicated

	GARRETT & FISHER		NIXON		THIS STUDY	
	Boys 100	Girls 100	Men 219	Women 140	Men 773	Women 665
Concentration developed by chess or checkers	93	96	—	—	81	75
Mathematics gives a logical mind	92	93	76	81	70	73
Man's senses five	69	80	76	78	57	59
Silent men deep thinkers	66	87	—	—	24	25
Overstudy causes feeble-mindedness	65	56	56	57	39	36
Artistic nature indicated by hands and fingers	55	61	42	52	38	41
Telepathic influence in staring	35	60	36	56	29	37
Face shows intelligence	51	72	50	62	23	29
Women purer than men by nature	50	63	38	53	18	29
Shifty eye indicates dishonesty	50	69	33	47	23	36
Prenatal influence	48	43	38	44	29	34
Slow learners good retainers	45	59	—	—	32	41
Some animals as intelligent as humans	43	66	25	48	20	23
Bright children physically retarded	43	29	32	33	33	32
Brains and beauty rarely go together	37	53	—	—	18	19
Fat people good natured	36	19	—	—	13	16
Thinking may cause disease	36	36	31	44	16	21
Faith can heal a broken limb	34	23	09	06	05	08
Instinctive knowledge of good	34	38	31	39	15	21
Marriage of cousins	32	32	34	50	20	25
Lines in hand foretell future	24	51	08	25	13	19
Influence of stars on character	21	40	15	20	20	21
Women inferior to men in intelligence	20	07	16	06	11	10
Cold hands warm heart	18	15	—	—	04	08
Burning ears	15	09	—	—	02	06
Blonds less trustworthy	13	03	—	—	14	08
Thirteen unlucky	05	03	01	00	00	01
Green-eyed people untrustworthy	04	02	04	04	06	04
Friday unlucky	03	06	01	00.7	00	00

That the "study of mathematics gives us a logical mind" and that the "number of man's senses is five" is subscribed to by more than three-quarters of the population studied. More than half believed that "man is superior because his conduct is guided by reason," and that "adults sometimes become feeble-minded from overstudy," or that "you can estimate an individual's intelligence pretty well by just looking at his face." At the other end of the scale fewer than 10 per cent believed the superstitions about "Friday" or "13" being unlucky, or that "green-eyed people are untrustworthy."

In view of Conklin's (2) results with superstitions, where the proportion who subscribed to or recalled having been influenced in the past by a superstition was much higher, there is little doubt that these particular examples of superstition are too crude for either high-school students or adults in school. The low percentages recorded here probably do not really reflect the prevalence of superstitious belief or practice in these populations.

The two studies mentioned also show that females mark significantly more items true than males, but that this effect is due to the selection of the items can readily be shown by breaking the items into groups which demonstrate either the reverse, or that there is no sex difference at all. The contention that the sex differences obtained depend on the specific items used is supported by Conklin's observation that most superstitions of men center about business and sport while women hold to superstitious beliefs in the domestic field. Both studies (Nixon's, and Garrett and Fisher's) exhibit practically the same order of prevalence when the items are arranged according to frequency for both males and females. Garrett and Fisher also show that with their group there is an insignificantly low correlation with intelligence (Stanford-Binet IQ?) whether chronological age is partialed out or not.

Gilliland (7) used the Nixon list, with added items, some true and some false, in a study of the changes occurring in a course in general psychology and Eurich and Longstaff (5)

have shown that similar items are valuable in psychology examinations in that they show marked changes when the end results are compared with pretest responses. Gilliland's results show a rather low correlation (−.22 and −.06, two samples) between final grade in the course and number of items marked true initially and substantially higher correlations (−.40 and −.25, two samples) at the end of the course. We would, therefore, infer a greater gain for the people who received the higher grades in the courses.

Caldwell and Lundeen (1) similarly have used items of this type in evaluating the results of instruction in "general science" and "biology" of the secondary school curriculum. For the number of superstitions held they also found low negative correlations with both intelligence and educational quotient.

THE PRESENT STUDY

Items based on the existing lists were prepared with additions of items both true and false bringing the total number to 87, of which 71 were false. These have been divided into groups labeled *Superstitions, Misconceptions Regarding the Relation of Physique and Traits, Biological Misconceptions, Economic and Social Misconceptions,* and *Psychological Misconceptions.* I consider these categories as matters of convenience since there must be considerable overlapping. From the standpoint of universality of belief, things have been put together which do not belong to the same class. We have computed no measures of central tendency nor of dispersion for the various subject-matter rubrics because they have no significance. The groups of items were arranged originally as controls to make certain that changes, which occur presumably as a result of instruction in psychology, are really consequences of the presumed antecedent and not a result of a growth in general skepticism attendant upon numerous experiences occurring between the beginning and end of the course.

The results for the three quarters (Winter and Spring, and the following Autumn, all of the year 1933), in which the propositions were submitted, follow. The directions read:

> "Some of the following statements are true, some are false. If you believe a statement to be true, circle the T; if false, circle the F. *Do not omit any statements.*"

The numbers in Table 2 are the proportions of the men and women separately (and the total) of the numbers involved who marked each item true.

The superstitions chosen for the first group of items are so ridiculous that they have not even been mentioned by most writers of college text-books. That they are not a problem for this population, except the first three, is obvious from the size of the proportions. For items 17 ("If your ears burn, it is a sign that some one is talking about you") and 18 ("Cold hands are the sign of a warm heart") Garrett and Fisher found 10 to 18 per cent of their 200 boys and girls indicated acceptance. For items 16 ("It is really unlucky to have anything to do with the number 13") and 19 ("Beginning an undertaking on Friday is almost certain to bring bad luck") they found only 3 to 6 per cent acceptance. Items 14 ("Dogs recognize the presence of death and give voice to their grief by howling"), 15 ("Certain lines in a person's hands foretell his future"), and 20 ("People born under the influence of certain planets show the influence in their characters") indicate a mystical conception of behavior, both human and animal, which does merit a consideration in a college course on the basis of the proportion of students who subscribe to such beliefs. These proportions agree substantially with Nixon's but are lower than Garrett and Fisher's, as might be expected.

A trend to be noted in passing is the increased skepticism of the groups at the beginning of the successive quarters. This can be accounted for on two bases: The freshmen, composing in all cases the majority of the group, are becoming more skeptical as a result of both college experience and selection,

TABLE 2

Per cent of the Number Indicated Expressing Each Belief for the Sexes Individually and for the Group as a Whole at the Beginning of Each of Three Quarters

	Men				Women				
	N = 352	N = 168	N = 353	TOTAL = 773	N = 316	N = 120	N = 229	TOTAL = 665	MEN & WOMEN N = 1438
	(A)	(W)	(S)		(A)	(W)	(S)		
Common Superstitions									
Item No.									
14. Dogs recognize death	45	39	32	39	46	43	42	44	42
20. Planetary influence	20	21	14	20	26	28	24	21	20
15. Palmistry	14	15	09	13	20	18	19	19	16
18. Cold hands—warm heart	08	07	04	06	09	09	08	08	07
13. If enough faith—a broken limb could be healed immediately	06	04	05	05	07	06	09	08	06
17. Ears burn—someone talking about you	02	04	02	02	06	05	06	06	04
19. Friday unlucky	01	00	01	00	01	01	02	01	01
16. Number 13 unlucky	00	00	01	00	00	00	00	00	00
Common Misconceptions Regarding Physique and Traits									
3. Long hands—artistic nature	45	39	28	38	44	41	38	41	39
1. Red-headed people—more temperamental	30	27	22	27	29	25	24	27	27
76. Character and shape of head	24	15	16	22	24	26	21	24	23
4. Receding chin—lack of will power	24	22	15	20	23	27	17	22	21
22. Blonds should marry brunets	20	25	16	20	23	21	16	21	20
82. Brains and beauty rarely go together	22	16	14	18	24	20	14	19	18
8. Fat people—good natured	21	16	13	17	14	09	14	13	16
10. Large mouth—generous	16	16	08	13	19	13	14	16	14
6. Blonds less trustworthy	14	18	11	14	10	04	07	08	11
11. Greenish eyes less trustworthy	06	07	06	06	08	04	04	06	06

TABLE 2—(*Continued*)

	N = 352	N = 168	N = 353	TOTAL = 773	N = 316	N = 120	N = 229	TOTAL = 665	MEN & WOMEN N = 1438
	Men				Women				
Economic and Social Misconceptions	(A)	(W)	(S)		(A)	(W)	(S)		
Item No.									
49. Large currency—circulation good	63	62	61	62	74	79	69	72	68
48. Exports exceed imports—depression	50	37	31	41	63	69	60	63	51
52. Paper dollars all backed	44	28	24	34	81	66	54	69	50
50. Liquid position good in inflation	43	34	36	38	52	47	46	53	45
46. High tariff assures prosperity	18	10	13	14	18	12	23	18	16
51. Nordic race source of all progress	10	07	10	09	15	17	14	15	12
Biological Misconceptions and Superstitions									
38. Grain found in Egyptian tombs known to sprout	61	56	54	57	58	62	54	57	57
36. Porcupine shooting quills	42	35	31	37	78	75	72	75	55
39. Snakes particularly affected by music	64	51	49	57	55	61	46	53	54
33. Beavers prepare for winter	59	46	33	47	66	52	45	56	51
31. Man came from monkey according to Darwin	56	47	35	47	60	66	39	54	50
35. Superior child not possible in racial cross	36	40	29	32	24	36	28	30	31
27. Mother can birthmark child	55	54	35	29	47	49	38	34	31
40. Cutting tails off rats	28	23	16	23	30	24	24	26	25
44. Humming bird never perches	21	20	12	18	33	28	33	32	24
30. Whales are big fish	17	12	14	15	36	34	30	33	23
42. Marriages of cousins—inferior child	24	18	15	20	25	28	24	25	22
43. Snake never dies until after sundown	13	09	08	11	18	21	21	20	15
41. Human nature entirely determined by heredity	14	12	09	12	08	14	12	10	11
24. Riding in autos—no legs	12	07	10	11	07	09	09	08	09
28. Baldness—due to tight hat bands	07	10	03	06	08	09	15	10	08

TABLE 2—(*Continued*)

	N = 352	N = 168	N = 353	TOTAL = 773	N = 316	N = 120	N = 229	TOTAL = 665	MEN & WOMEN N = 1438
	Men				Women				
Psychological Misconceptions Item No.	(A)	(W)	(S)		(A)	(W)	(S)		
65. Chess playing develops concentration	85	85	74	81	79	78	69	75	79
59. Mathematics gives us a logical mind	75	70	66	70	77	59	71	73	72
74. Psychology can pick job best fitted for	66	68	56	62	75	80	75	74	67
78. Red especially exciting to cattle	63	61	56	60	70	78	62	67	63
71. Children learn faster than adults	62	60	49	57	73	67	61	67	61
88. Primitive people have keener senses	63	60	58	61	56	62	58	56	58
62. Man has only 5 senses	57	61	51	57	61	55	59	59	58
58. Persons may be caused to perform criminal acts while hypnotized	58	54	52	55	44	57	65	53	54
69. Majority of criminals very low in intelligence	55	57	57	56	52	50	49	51	54
85. Mothers intuitively know child care	56	54	37	49	56	61	50	53	51
81. Women have intuition	50	37	24	39	59	56	48	54	46
21. Innate urge to jump from high places	54	48	40	48	48	42	38	43	46
25. Fright of an expectant mother may cause birthmark	55	54	35	48	47	49	38	44	46
79. Hypnotized person weak minded	45	49	34	42	50	52	36	44	43
77. Overstudy causes feeble-mindedness	44	41	32	39	37	40	35	36	38
67. Slow learner remembers better	38	32	27	32	41	41	41	41	37
55. Born criminal a physical type	38	29	28	32	46	44	38	42	37

TABLE 2—(*Concluded*)

	N = 352	N = 168	N = 353	TOTAL = 773	N = 316	N = 120	N = 229	TOTAL = 665	MEN & WOMEN N = 1438
	Men				Women				
	(A)	(W)	(S)		(A)	(W)	(S)		
54. Most great men born of poor but honest parents	42	40	24	35	39	32	35	36	36
83. Telepathic influence in staring	26	35	30	29	39	42	35	37	33
64. Very intelligent children weak physically	36	35	29	33	35	35	28	32	33
80. Shifty eye—dishonest	27	23	18	23	44	39	28	36	29
60. Easier to learn German if you have German ancestry	28	32	23	27	33	34	24	29	28
72. Fast workers make more mistakes than slow workers	27	27	24	26	30	14	28	26	26
70. You can estimate an individual's intelligence by looking at his face	28	20	19	23	31	34	25	29	26
7. Silent men are deep thinkers	31	23	17	24	31	20	19	25	25
86. Women are by nature purer than men	21	22	11	18	38	29	21	29	23
68. Men are created equal in capacity	28	20	14	21	25	24	22	24	22
84. Some animals as intelligent as average man	23	23	14	20	22	23	25	23	21
87. Conscience—inborn	22	16	09	15	23	18	21	21	18
5. Physical or mental disease contracted by thinking	20	14	14	16	24	21	17	21	18
57. Best way to learn to swim is to be thrown in	16	12	13	14	19	23	24	22	17
24. Prenatal influence on later development	11	10	10	10	17	08	08	13	11
61. Mind exempt from bodily processes	10	13	11	11	10	18	11	12	11
63. Women inferior to men in intelligence	10	10	12	11	11	04	06	08	10

and the proportion of freshmen composing the groups is becoming smaller.

Aside from the fact that the proportions change from quarter to quarter, the rank order of the items remains the same for each of the nine orders possible. This speaks well for the relative stability of the order of the beliefs even though there is a change in the absolute amount of credulity expressed.

Men and women are kept separate here because all previous investigations with items of this type have shown women to be more credulous than men. In this first group of items there are two which show a statistically significant difference: item 15 ("Certain lines in a person's hands foretell his future") and item 17 ("If your ears burn, it is a sign that some one is talking about you") with a C.R. of 3.0 and 3.4, respectively.

The same trends pointed out in connection with the small sample of superstition are also apparent in the "faulty character schemes" in the second group. They are of sufficient interest as a part of the background of the elementary student to be discussed on the same basis as the more strictly psychological items.

The fifteen biological misconceptions, on the whole, exhibit more naïveté than either of the other two groups that we have just discussed; while the sex differences range in significance from none at all, in the case of item 38 ("Grain found in Egyptian tombs frequently sprouts after 3000 years of dormancy"), to a maximum in the case of item 36 ("In case of imminent danger a porcupine protects himself by shooting his quills") where the difference is about 16 times its standard error. Items 33 ("Beavers know whether an approaching winter is to be mild or severe, long or short, and prepare themselves accordingly"), 43 ("A snake never dies until after sundown"), 44 ("A humming bird never perches") and 30 ("Whales are big fish") also exhibit reliable sex differences. Items 39 ("Snakes are particularly affected by music"), 35 ("Superior children are not possible as a result of crosses between races, as Japanese and Americans"), and 41 ("Human nature is en-

tirely determined by heredity") reverse the usual trend in indicating men to be less skeptical than women, but the differences are not statistically significant.

The order of the various items remains practically unchanged from quarter to quarter in each sex separately ($\rho = .95$); the rank order coefficient between the results for all the men and all the women is $\rho = .89$ for the 15 items.

A logical consideration might show that items 36 ("In case of imminent danger a porcupine protects himself by shooting his quills"), 39 ("Snakes are particularly affected by music"), 33("Beavers know whether an approaching winter is to be mild or severe, long or short, and prepare themselves accordingly"), 27 ("It is possible for a mother to birthmark her child"), 44 ("A humming bird never perches"), 43 ("A snake never dies until after sundown"), and 28 ("Bald headedness is due principally to tight hat bands") are rank superstitions. Their incidence is not different from the items of misinformation or technical definition, which are found in the list. In view of our results, teachers of biology would be justified in spending more time and vigor in pointing out the true nature of the specialization of porcupine quills than in showing that the whale is not a fish.

Aside from mere change in the kinds of subject matter emphasized, the method of presenting the material is likewise important. That a teacher, as Caldwell has pointed out, could have a group of students who knew all manner of scientific facts about the beaver, for instance, and still insist on its skill in weather prognostication is not beyond the realm of possibility in view of our results.

The *economic* and *social* list comprises only six items. In each of these cases there is a statistically significant difference between the sexes in favor of less naïveté in the case of the men.

The *psychological* group contains 32 items. The trend toward more orthodox information at the beginning of the two later quarters is again present, but is not so marked as in the case of the less specialized beliefs. The rank order coefficient

between successive quarters for the men and women separately is ρ .95, while between the totals for the sexes, regardless of the quarter, it is ρ .89. As before, we conclude that although a larger proportion of the women subscribe to each misconception, the order remains practically the same for both sexes. The exceptions to the trend towards male skepticism are items 58 ("Persons can be caused to perform criminal acts while hypnotized"), 21 ("There is an innate urge to jump off high places"), 25 ("A fright that an expectant mother experiences before the birth of her child may mark the child"), 69 ("The majority of criminals are very low in intelligence"), 77 ("Adults sometimes become feeble-minded from overstudy"), 64 ("Very intelligent children are likely to be weak physically"), and 63 ("Women are inferior to men in intelligence"); in none of these cases is there a statistically significant difference. For 10 of the items there is a significantly smaller proportion of men who hold the misconception. They are in order: items 81 ("Women have a power of intuition that men do not have"), 80 ("A person who does not look you in the eye is likely to be dishonest"), 86 ("Women are by nature purer and better than men"), 74 ("Psychology can determine what specific job a man is best fitted for"), 65 ("Chess playing will develop your power of concentration"), 55 ("The born criminal is a physical type readily recognized by the criminologist"), 71 ("Children can learn faster and better than adults"), 57 ("The best way to learn to swim is to be thrown bodily into the water"), 67 ("A slow learner remembers what he has learned better than a fast learner"), 69 ("The majority of criminals are very low in intelligence"). The highest C.R. is 5.3; the lowest 3.3.

In one sample containing 562 cases correlations were obtained between total number of errors in marking the false items in the total list of 87 and centile rank on the Ohio State University college entrance examination. The Pearsonian r was $-.32$ and with grade in the course was $-.37$. Caldwell and Lundeen found an r of $-.23$ in a ninth-grade group containing

324 members, and a somewhat higher ($r = -.32$) relationship with E.Q. and with another group of 530 seventh- and eighth-grade students. Differences in tests for both misconceptions and intelligence and differences in the age of groups make the correlations not directly comparable. These data do seem to point to a somewhat higher inverse relationship between number of misconceptions and score on the usual "intelligence test" than would be inferred from Garrett and Fisher's finding, $-.02$ for boys and -0.11 for girls. It might even be possible, using "intelligence test score" for the criterion to select items that would consistently exhibit some validity in this respect.

PART II

THE EFFECT OF INSTRUCTION

The effects of instruction on the reduction of misconception are shown in two charts and several tables. The papers were scored in terms of errors and Figure 1 shows the cumulative percentage of the groups making each of the scores indicated on the abscissa at the beginning of the quarter's work. The curve labeled "402 Beginning" was composed of 210 students who had passed in five hours of beginning psychology during some previous quarter; about 50 per cent of it the quarter immediately preceding. The median number of errors is 15, and as might be expected, it is the least naïve. It is to be compared with the group labeled "Winter Beginning," which had had no previous instruction in psychology. As Part I of this study shows in a different way, there is a gradual increase in naïveté from the Spring Quarter to the Autumn Quarter. The Spring Quarter scores are reliably better where compared with either those of the Autumn or Winter Quarters, but the latter two are not significantly different from each other. The Dayton Group of Figure 1 consists of 57 persons enrolled in an extension course in psychology. Their high-school training had been casual and the socio-economic level is reflected in the large proportion of filling-station attendants and beauty-parlor

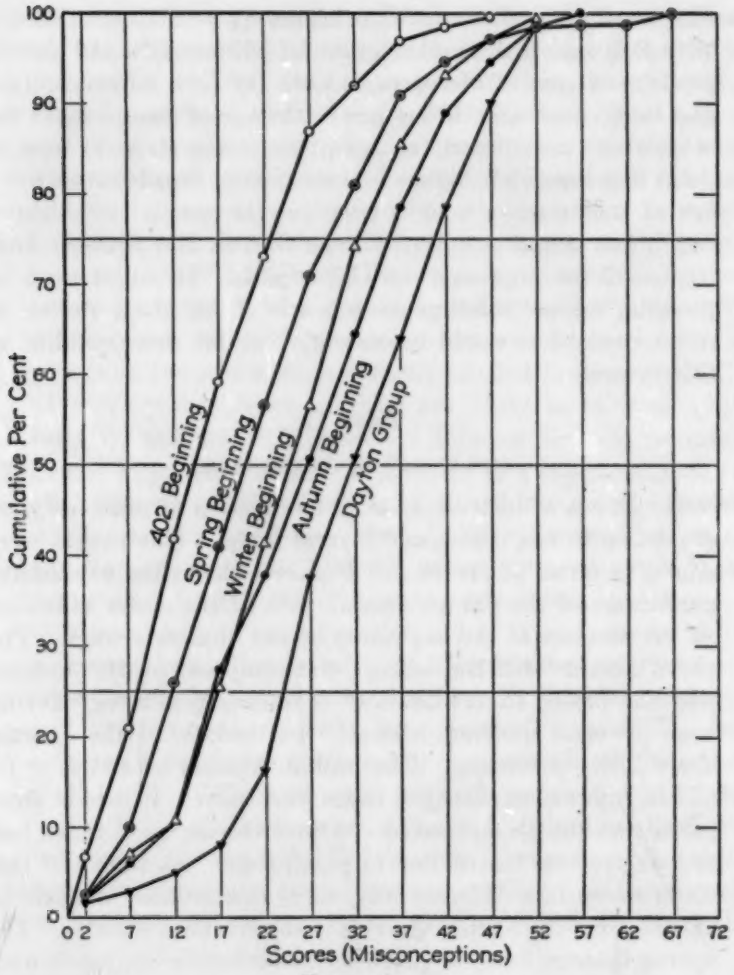

FIGURE 1.

operatives in the group. The median number of errors for this group is approximately twice that of the 402 students.[2]

[2] I am indebted to Dr. J. H. Taylor, who collected these data. There was no attempt made to measure the misconceptions surviving at the end of this course. We are interested in demonstrating the validity of the test, not the effectiveness of Dr. Taylor's instruction.

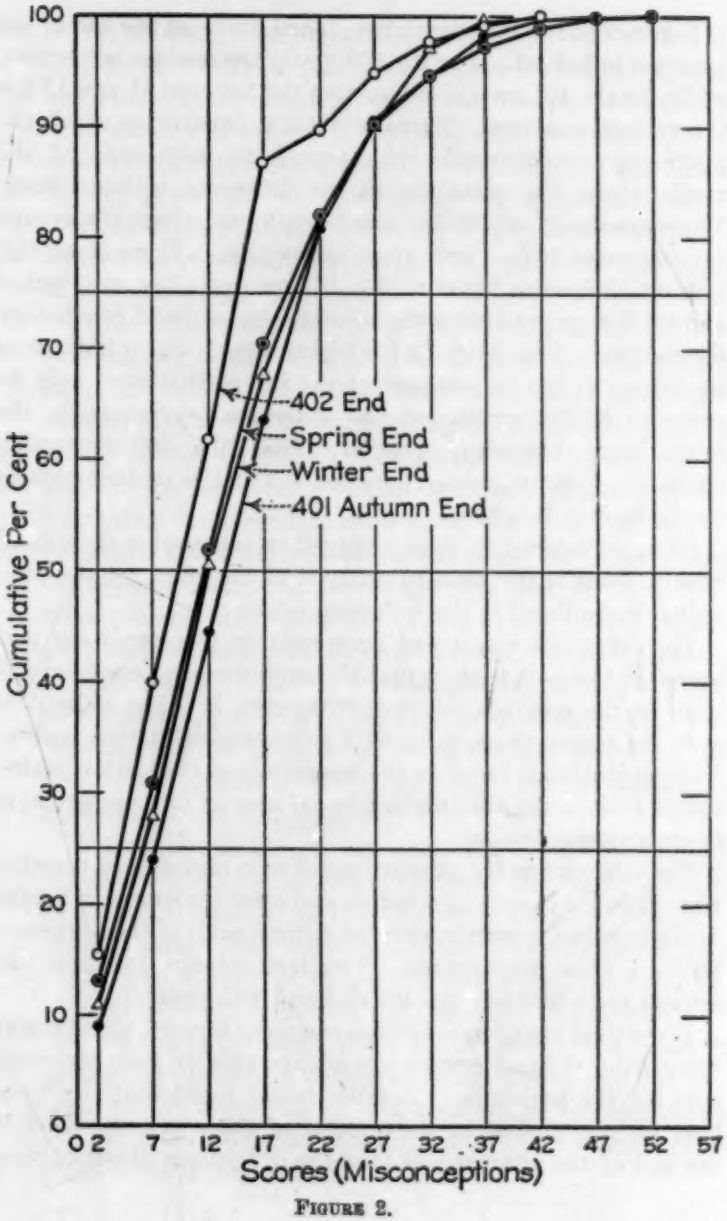
100
90
80
70
60
50
40
30
20
10
0
Cumulative Per Cent
402 End
Spring End
Winter End
401 Autumn End
0 2 7 12 17 22 27 32 37 42 47 52 57
Scores (Misconceptions)

FIGURE 2.

Figure 2 shows the cumulative distributions at the end of the quarters indicated. For the 402 group the median is 9 errors, while for the 401 groups the median lies between 11 and 13 for the various quarters. There is, thus, a persistence of all the previously noted trends with regard to magnitude of the medians and the reliability of the difference between them. There are significant differences in each case where the groups are compared before and after instruction. There is no significant difference between the 401 groups after instruction and the 402 group before the additional quarter of psychology instruction. This latter fact is highly significant in indicating something of the permanence of the instruction since only 50 per cent of the enrollment had taken its psychology in the immediately preceding quarter. That the 402 beginning median is slightly greater than the 401 end is understandable on the basis of this fact.

Of more interest to those engaged in instruction than these general facts is the detailed analysis of the gains for the individual items listed in the following tables.

The categories mentioned previously in this paper are preserved in this part to show that although there is some improvement in the non-psychological categories, it is not so marked as in the case of the more strictly psychological subject matter. This conclusion is based on the magnitude of the critical ratios, rather than in the absolute loss in per cent of those subscribing to each misconception.

The tables show the proportions of men and women together who subscribe to each item before and after the course indicated in the heading, together with the critical ratio of the difference between these proportions. The last column indicates the critical ratio between the 401-end and 402-beginning.

These data are open to critical comment because the numbers comprising the end groups are always smaller than the numbers for the beginning. A critic might insist that there has been no real change in the opinion of those who persisted to the end of the quarter and that the differences obtained thus

represent a selection rather than a change. In the case of one quarter (N = 562) we paired each paper for beginning and end and consequently built up groups that contained exactly the same number of cases. Since there were no differences in the conclusions that could be drawn from this and the less satisfactory procedure which we used, we decided that the extra labor involved in obtaining the pairs was not worthwhile. The Pearsonian *r* beginning score and end score for this group of 562 cases was 0.58.

If we refer to Table 3, it is evident that of the eight items relating to popular superstition the first five can be said to have exhibited reliable differences before and after the first course; they also show further improvement as a result of the second course, but hardly, as a group reliably so. The minus signs in the last column of critical ratios indicate that the 402 beginning enrollment is more naïve than the 401 end. This reversal is statistically significant in two of the items, 15 and 20.

Common misconceptions regarding the relation between physique and behavior traits (Table 4) are clearly reduced as evidenced by the size of the critical ratios. In every case except the last (item 11) there is more skepticism expressed at the end of the first course than at the beginning of the second, but the differences in proportion are not strikingly significant, nor is there any significant change as a result of the second course excepting in one item (No. 76).

The small sample of economic and social misconceptions (Table 5) included in this study show that although there is increased skepticism in this field as a whole, it is barely significant rather than convincingly so. There are no significant changes as a result of the second course and there are no significant differences between the beginning of the second course and the end of the first. There is a reversal of the trend shown in the two previously displayed categories in that the proportions at the beginning of 402 subscribing to false items are smaller than at the end of 401 (indicated by absence of minus signs in the last column of C.R.'s).

TABLE 3
Superstitions

	401			402			
	MEN & WOMEN BEGINNING N = 1438	MEN & WOMEN END N = 1372	CRITICAL RATIO	MEN & WOMEN BEGINNING N = 210	MEN & WOMEN END N = 197	CRITICAL RATIO	401 END WITH 402 BEGINNING CRITICAL RATIO
ITEM NO.							
14. Dogs recognize death and give voice to their grief	42	18	13.7	23	11	3.2	– 1.6
15. Certain lines in a person's hand foretell his future	16	02	13.2	09	03	2.5	– 3.4
20. Planetary influence on character	20	05	11.5	13	07	2.0	– 3.3
18. Cold hands—warm heart	07	02	6.7	03	00	2.4	– 0.8
17. Burning ears—someone talking about you	04	01	4.6	01	00	1.4	0.0
13. If man had faith—broken limb could be healed	06	04	2.2	04	00	2.5	0.0
19. Friday unlucky	01	00	3.3	00	00	0.0	0.0
16. No. 13 unlucky	00	00	0.0	00	00	0.0	0.0

TABLE 4
Common Misconceptions Regarding Physique and Traits

	401			402			
	MEN & WOMEN BEGINNING N = 1438	MEN & WOMEN END N = 1372	CRITICAL RATIO	MEN & WOMEN BEGINNING N = 210	MEN & WOMEN END N = 197	CRITICAL RATIO	401 END WITH 402 BEGINNING CRITICAL RATIO
ITEM NO.							
3. Long hands—artistic nature	39	07	21.3	21	12	2.4	– 4.7
1. Red headed people—more temperamental	27	04	17.0	12	05	2.5	– 3.3
76. Character and shape of head	23	04	14.6	12	02	3.9	– 3.3
4. Receding chin—lack of will power	21	03	14.4	08	04	1.7	– 2.5
10. Large mouth—generous	14	02	11.4	04	02	1.1	– 1.4
6. Blonds less trustworthy	11	01	11.1	04	03	0.5	– 2.1
8. Fat people—good natured	16	04	10.0	05	04	0.5	– 0.6
22. Blonds should marry brunets	20	07	9.6	09	08	0.4	– 0.9
82. Brains and beauty rarely go together	18	07	8.5	11	08	1.0	– 1.7
11. Greenish eyes less trustworthy	06	01	6.7	00	00	0.0	3.3

TABLE 5
Economic and Social Misconceptions

	401			402			
	MEN & WOMEN BEGINNING N = 1438	MEN & WOMEN END N = 1372	CRITICAL RATIO	MEN & WOMEN BEGINNING N = 210	MEN & WOMEN END N = 197	CRITICAL RATIO	401 END WITH 402 BEGINNING CRITICAL RATIO
ITEM NO.							
52. Paper dollars all backed by gold	50	37	6.6	34	23	2.4	0.8
49. Large currency—circulation good	68	58	5.3	51	40	2.2	1.8
46. High tariff assures prosperity	16	10	4.6	08	07	0.4	1.0
50. Liquid position good in inflation	45	39	3.1	39	30	1.9	0.0
48. Exports exceed imports—depression	51	47	2.0	37	40	0.6	2.7
51. Nordic race source of all progress	12	12	0.0	10	10	0.0	0.9

TABLE 6
Biological Misconceptions

ITEM NO.		401			402			
		MEN & WOMEN BEGINNING N = 1438	MEN & WOMEN END N = 1372	CRITICAL RATIO	MEN & WOMEN BEGINNING N = 210	MEN & WOMEN END N = 197	CRITICAL RATIO	401 END WITH 402 BEGINNING CRITICAL RATIO
33.	Beavers prepare for winter	51	27	12.9	30	16	3.3	− 0.9
39.	Snakes particularly affected by music	54	36	9.5	42	36	1.2	− 1.6
31.	Man came from monkey according to Darwin	50	34	8.4	34	23	2.4	0.0
30.	Whales are big fish	23	11	8.0	20	11	2.5	− 3.1
43.	A snake never dies until after sundown	15	07	6.1	08	03	2.2	− 0.5
27.	Mother can birthmark child	31	19	6.1	22	14	2.1	− 0.9
41.	Human nature entirely determined by heredity	11	05	5.5	04	00	2.8	0.7
42.	Marriage of cousins—inferior child	22	14	5.3	15	11	1.2	− 0.4
40.	Cutting tails off rats	25	18	4.4	15	14	0.3	1.1
34.	Continuous riding in autos—no legs	09	05	4.0	07	03	1.8	− 1.1
35.	Superior child not possible in racial cross	31	25	3.3	28	18	2.4	− 0.9
44.	Humming bird never perches	24	20	2.4	11	06	1.7	3.6
36.	Porcupine shooting quills	55	51	2.0	42	36	1.2	2.4
38.	Grain found in Egyptian tomb known to sprout	57	55	1.0	58	48	2.0	− 2.4
28.	Baldness—due to tight hat bands	08	07	0.9	06	05	0.4	0.5

TABLE 7
Psychological Misconceptions

ITEM NO.		401			402			
		MEN & WOMEN BEGINNING N = 1438	MEN & WOMEN END N = 1372	CRITICAL RATIO	MEN & WOMEN BEGINNING N = 210	MEN & WOMEN END N = 197	CRITICAL RATIO	401 END WITH 402 BEGINNING CRITICAL RATIO
79.	Hypnotized person weak minded	43	10	20.6	16	14	0.6	− 2.2
62.	Man has only five senses	58	32	13.7	27	19	1.9	1.5
7.	Silent men deep thinkers	25	06	13.6	07	03	1.8	− 0.5
70.	You can estimate an individual's intelligence by looking at face	26	08	12.8	12	09	0.9	− 1.6
80.	Shifty eye—dishonest	29	10	12.7	12	05	2.5	− 0.8
55.	Born criminal a physical type	37	16	12.3	18	13	1.4	− 0.7
78.	Red especially exciting to cattle	63	40	12.1	56	42	2.6	− 4.2
81.	Women have intuition	46	25	11.7	26	15	2.7	− 0.3
83.	Telepathic influence in staring	33	14	11.6	31	12	4.8	− 5.0
85.	Mothers intuitively know child care	51	30	11.0	34	19	3.4	− 1.1
*64.	Very intelligent children weak physically	33	15	10.9	22	14	2.1	− 1.6
*54.	Most great men born of poor but honest parents	36	18	10.6	22	17	1.3	− 0.6
21.	Innate urge to jump from high places	46	28	9.7	28	26	0.4	0.0
*67.	Slow learner remembers better	37	20	9.4	27	08	5.1	− 2.1
*84.	Some animals as intelligent as average man	21	08	9.3	12	06	2.1	− 1.6
87.	Conscience—inborn	18	06	9.2	09	04	2.0	− 1.4
86.	Women are by nature purer than men	23	10	8.9	12	05	2.5	− 0.8

* More likely to be treated in the second course (402) than in the first (401).

TABLE 7—(*Concluded*)

ITEM NO.	401 MEN & WOMEN BEGINNING N = 1438	401 MEN & WOMEN END N = 1372	401 CRITICAL RATIO	402 MEN & WOMEN BEGINNING N = 210	402 MEN & WOMEN END N = 197	402 CRITICAL RATIO	401 END WITH 402 BEGINNING CRITICAL RATIO
*72. Fast workers make more mistakes than slow workers	26	14	8.3	16	08	2.4	−0.7
25. Fright of an expectant mother may cause birthmark	40	25	8.2	36	24	2.6	−3.1
*59. Mathematics gives us a logical mind	72	57	7.9	49	41	1.6	2.1
*69. Majority of criminals very low in intelligence	52	38	7.2	49	42	1.4	−2.9
* 5. Physical or mental disease contracted by thinking	17	08	6.9	12	08	1.3	−1.6
*88. Primitive people have keener senses	58	45	6.7	45	38	1.4	0.0
*77. Overstudy causes feeblemindedness	38	27	6.1	26	10	4.2	0.3
24. Prenatal influence in later development	11	04	6.0	04	03	0.0	0.0
*60. Easier to learn German if you have German ancestor	28	19	5.4	20	12	2.2	−0.3
58. Persons may be caused to perform criminal acts while hypnotized	54	44	5.3	64	55	1.8	−5.5
*68. Men created equal in capacity	22	15	4.7	12	09	0.9	1.2
74. Psychology can pick job best fitted for	67	58	4.7	63	55	1.6	1.4
*63. Women inferior to men in intelligence	09	05	4.0	09	08	0.4	−1.9
*71. Children learn faster than adults	61	54	3.6	52	58	1.2	−0.5
61. Mind exempt from bodily processes	11	08	2.5	10	07	1.1	−0.9
65. Chess playing develops concentration	62	66	−2.1	76	52	5.0	−3.0

* More likely to be treated in the second course (402) than in the first (401).

The *biological* category (Table 6) is questionably a control. It is not likely that one could teach a course in psychology without correcting some of the misconceptions classified under this rubric. Item 33 is a case in point. It is conceivable that in developing the general principle that all acts are consequences of preceding or simultaneous factors and never a result of future events, a student might pick up enough information which would make him skeptical of the beaver's capacity to prepare for winter even though that particular illustration may never have been used. Of greater importance is the fact that some of the students are taking zoology at the same time that they are registered for psychology. These two and possibly some other factors unite to give significant differences between the beginning and end of the psychology course for most of the biological items. The magnitude of the critical ratios shows that the differences are not so striking as in the case of the "physique and traits" category, nor to anticipate, not so great as for the more strictly psychological subject matter of the next section.

In the *psychological* group the treatment of the data is complicated by the fact that the items overlap the two courses. The ones more likely to be treated in the second course are marked in the table with asterisks. There is no assurance, however, that an individual instructor will not treat of one so marked in the first course; but even so, we might expect less change in these items. This assumption is substantiated by the data displayed in Table 7. Of the five items which show statistically significant changes as a result of the second course, 67, 65, and 77 are a distinctive part of its subject matter while 83 and 85 might come up in either course.

There are four items 58, 83, 78, and 65 where the beginners in the second course are significantly more naïve than those that finish the first course. Item 65 is particularly interesting because a larger proportion subscribed to it at the end of the first course than at the beginning. (Indicated by the negative critical ratio.) This same trend is continued at the beginning

of the second course where 76 per cent subscribe to the misconception. This proportion is significantly reduced to 52 per cent in the second course. But that it is not reduced further in a course where "formal discipline" is part of the subject matter is a matter of some concern. The results on this item together with those other items that indicate more than 10 to 12 per cent acceptance of a misconception have led us to emphasize differentially the subject matter of the course in the light of these results.

The data reported here were all collected in 1933. Since that time we have regularly made use of some of these items in appraising the effectiveness of instruction in these two courses. They are particularly valuable in serving as false items when mixed with the scientific principles of psychology in a "recognition of principles tests" (3).

As a result of the survey we conclude with Dudycha (4) that instruction in college is too general. Too much is expected in the way of transfer from broad general scientific principles to specific items of everyday experience. Only a few students are capable of incorporating scientific principles into their everyday lives unaided by an instructor. By no means the least problem in this connection is to get instructors themselves to make this transfer. For too many of us psychology is an academic discipline devoid of practical significance.

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THE RELATIVE SOCIAL PRESTIGE OF REPRESENTATIVE MEDICAL SPECIALTIES

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A NUMBER of earlier studies have indicated that the medical profession as a whole occupies a high, if not the highest, place in the vocational hierarchy of contemporary American society. This conspicuous elevation is recognized not only by varied samplings of the general public, but also by members of closely comparable groups such as lawyers, engineers, university professors, etc.[1] Does this "halo" result from a recognition of the important social service performed by highly selected and competent medical workers, or is it simply a consequence of greater familiarity with their occupational designations and functions?

No ready answer to this question can be given, but it occurred to the writer that a determination of the prestige hierarchy *within* the various subdivisions of the medical field would not only be interesting *per se,* but that it might also cast some light on the relative positions of the specialist and the general practitioner as seen by their clients. A list of the following twenty-five careers allied with the healing art was selected: alienist, bacteriologist, chiropractor, dentist, dietitian, electrotherapist, gynecologist, manicurist, midwife, oculist, ophthalmologist, optician, optometrist, orthopedist, osteopath, pediatrician, pharmacist, physician, practical nurse, psychiatrist, psychologist, registered nurse, roentgenologist, surgeon, veterinarian. "Manicurist" was deliberately inserted because of the desirability of having a definite "bottom" in the list.

After printing the name of each occupation upon a plain white card, the following directions were given in connection with personal interviews (arranged at random by the writer

[1] For a recent study see G. W. Hartmann, "The Prestige of Occupations," *Personnel Journal,* Vol. 13, 144–152, Oct. 1934.

and some of his qualified assistants) involving 250 adults of both sexes:

On each of the accompanying cards you will find the name of a familiar occupation. You probably do not feel the same about each one. Place the cards in the *order of your admiration* for the professions or vocations here given. Try to answer for yourself the question, Which occupation do I respect most? Then ask, Which occupation do I think least of? Finally, place all the remaining occupations in their proper position, according to your esteem for them. Do not base your judgment upon any particular person, but simply rank the occupations according to your *general opinion* about them.

Following each ranking the interviewer took a numerical record of the placement order and shuffled the cards before submitting them to the next subject. Three consecutive community samples were made during the Spring of 1935. The first group comprised one hundred persons in and about the vicinity of Summit Hill, Pa., an industrial and coal-mining town in the eastern portion (Carbon County) of the state; the second group consisted of one hundred inhabitants of Centre County, a diversified agricultural section of Central Pennsylvania; the third sample was made up of fifty upperclassmen and graduate students at The Pennsylvania State College, drawn from all parts of the commonwealth. The raters came from a wide range of occupations, but housewives constituted the largest single group.

The mean rankings obtained from these three groups, together with a combination of all, are arranged in *decreasing* order of social prestige in the table below:

In appraising these findings, the first thing to be noted is that the easily understood and well-recognized occupations stand either near the top or the bottom of the list. Their greater "comprehensibility" is in part indicated by the smaller variabilities accompanying them. Specialties with "harder" titles are apparently also obscurer as to function, with the typical result that unless he is recognized as a certain

TABLE I

The Relative Social Status of 25 Medical Branches in the Judgment of 250 Pennsylvania Laymen

ORDER	CARBON COUNTY RATINGS		CENTRE COUNTY RATINGS		PENN STATE RATINGS		COMPOSITE RATINGS		A.D.
1	Surgeon	2.73	Physician	3.43	Surgeon	2.23	Surgeon	3.31	2.65
2	Physician	3.66	Surgeon	4.43	Physician	4.15	Physician	3.67	2.38
3	Dentist	8.34	Dentist	7.49	Psychiatrist	4.92	Dentist	8.47	4.67
4	Roentgenologist	8.93	Reg. Nurse	8.82	Gynecologist	5.23	Bacteriologist	9.96	6.29
5	Psychiatrist	10.13	Pharmacist	9.33	Bacteriologist	7.31	Gynecologist	9.98	5.07
6	Gynecologist	10.20	Bacteriologist	10.98	Pediatrician	9.23	Psychiatrist	10.74	5.14
7	Bacteriologist	10.26	Optician	11.13	Alienist	10.31	Reg. Nurse	11.65	5.25
8	Ophthalmologist	10.53	Gynecologist	12.13	Dentist	10.69	Pharmacist	11.84	5.82
9	Psychologist	10.78	Oculist	13.03	Psychologist	11.15	Roentgenologist	12.02	5.11
10	Orthopedist	11.21	Optometrist	13.51	Oculist	11.47	Psychologist	12.07	5.27
11	Pharmacist	12.74	Pediatrician	13.55	Ophthalmologist	11.87	Oculist	12.68	5.77
12	Oculist	12.93	Pract. Nurse	13.74	Reg. Nurse	12.46	Pediatrician	12.71	4.12
13	Pediatrician	13.60	Psychiatrist	13.75	Roentgenologist	13.00	Orthopedist	12.85	5.24
14	Alienist	13.74	Psychologist	13.82	Orthopedist	13.08	Ophthalmologist	12.86	4.67
15	Dietitian	13.92	Chiropractor	13.88	Osteopath	14.17	Alienist	13.82	4.42
16	Reg. Nurse	14.07	Midwife	14.23	Dietitian	14.23	Optician	14.48	6.14
17	Electrotherapist	14.13	Roentgenologist	14.63	Pharmacist	15.08	Dietitian	14.60	5.37
18	Optometrist	14.41	Alienist	15.15	Optician	15.45	Osteopath	14.88	4.93
19	Osteopath	14.80	Osteopath	15.31	Electrotherapist	16.54	Optometrist	15.14	4.70
20	Veterinarian	16.01	Orthopedist	15.37	Pract. Nurse	18.02	Electrotherapist	15.27	4.71
21	Optician	16.33	Dietitian	15.39	Veterinarian	18.69	Pract. Nurse	15.78	5.95
22	Pract. Nurse	16.72	Electrotherapist	15.53	Optometrist	19.85	Chiropractor	17.27	5.45
23	Chiropractor	19.07	Ophthalmologist	15.68	Chiropractor	20.46	Veterinarian	17.82	4.94
24	Midwife	21.24	Veterinarian	19.37	Midwife	21.62	Midwife	18.51	5.55
25	Manicurist	24.27	Manicurist	21.32	Manicurist	24.69	Manicurist	23.18	3.64

$r_{CaCe} = .38$ $r_{CePs} = .59$ $r_{CaPs} = .87$

kind of orthodox "physician," the ophthalmologist falls below the registered nurse in status! Otologists, rhinologists and laryngologists may be esteemed labels within the profession, but the multitude apparently will like these individuals much better if they call themselves plainly "ear, nose and throat doctors"!

However, these patent factors of feeling-tone and familiarity do not tell the whole story. Some recognition of objective difference must account for the pronounced gap between the position of the practical as compared with the registered nurse. The inferiority of the chiropractor to the osteopath is in accordance with expert opinion. The slight edge of the surgeon over the physician (whether warranted or not) is reinforced by the fact that the surgeon was listed first in 38 per cent of the series in contrast to the physician's 32 per cent; the dentist and bacteriologist, who were tied third in the order of first mentions, received only 6 per cent each. The much-desired differentiation among oculists, opticians and optometrists is evidently on its way, although it can hardly be said to have progressed very far.

The odd contrast between the position of the alienist and the psychiatrist is probably caused by the obsolescent nature of the former term, although the unfavorable connotation created by the newspaper reports of certain famous trials as well as the xenophobia involved in the sound of "alien" may be contributory. Despite his recent close association with soda fountains, the pharmacist emerges with more nominal prestige than the roentgenologist, the pediatrician and orthopedist. This may be a result of the layman's inarticulate suspicion that these rare and impressive words are a mere front for high-grade quackery, plus the general tendency—known to every teacher who distributes marks—to scatter all uncertain cases in the center of a rating scale.

On the whole, it appears that greater acquaintance with an occupation leads to a sounder appraisal of its comparative level. It is not quite correct to say that the public esteems that

which it knows (*cf.* the relatively low status of midwife and veterinarian, which may be hard to support on valid grounds), but it is true that those careers about which it is less informed receive a hesitant and dubious ranking. In practice it seems that the typical medical specialist is more favorably reacted to as "a particularly qualified physician" than as a technician offering a highly limited type of service.

From the size of the intercorrelations among the three populations, it is clear that the rank orders will fluctuate noticeably with other geographically distinct samplings, but these shifts will be largely confined to the central part of the list. An extension of this inquiry to include ratings from a large group of members of the American Medical Association would be desirable, if only as a measure of the prevalence of stereotypes among superior practitioners. Meanwhile we can not only be sure that the surgeon and physician are at the peak of the current occupational hierarchy—they are also at the apex of those interrelated fields of "applied biology" which constitute the broad domain of medicine itself.

RURAL AND URBAN ORIGINS OF MEMBERS OF THE AMERICAN CONGRESS

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SEVERAL different studies have been reported on the rural and urban origins of political leaders. The only one of these that has shown a superior production by the rural population in relation to total population was that of Spillman. Ninety-two per cent of presidents of the United States before 1909, and 91.2 per cent and 83.9 per cent, respectively, of United States governors (1909) and cabinet members (1869–1903) were born on farms or in villages.[1] The rural percentage of the total population of the country ranged from 96.7 per cent in 1790 to 87.5 per cent in 1850 and 77.3 per cent in 1880.[2] There is thus a clear margin in favor of the farm and village population in the production of the 1909 governors and cabinet ministers from 1869 to 1903, and when the entire period of American history from 1789 to 1909 is considered, the rural population surpasses the urban in producing presidents. This conclusion is based on the fact that the rural population produced a larger proportion of these leaders than it constituted of the total population of the country at a period contemporaneous with the birth of the leaders.

Many other studies lead to a conclusion of urban superiority. Giese classified a total of 322 Germans listed in *Wer ist's* and engaged in politics by place of birth in rural areas, small cities, and large cities. A total of 49.4 per cent were born in rural areas,[3] compared with 71.32 per cent of the total German

* The author acknowledges the assistance of Florence Walters, Lois Barnett, Lucille Albright, Mary Madison, and Eleanor Rose in the collection of data.

[1] Spillman, W. J., "The Country Boy," *Science*, n.s., Vol. XXX (1909), pp. 405–407.

[2] *Abstract of the Fifteenth Census of the United States*, p. 20, Washington, 1933.

[3] Giese, F., *Die öffentliche Persönlichkeit* (Beihefte zur Zeitschrift für angewandte Psychologie, Heft 44), Leipzig, 1928.

population living in rural areas in 1880, and even larger percentages before that time.[4]

Huntington and Whitney's data show a very slight superiority of the urban population. Of 656 government officials listed in *Who's Who in America,* 1926–27, a group equivalent to 81.7 per cent were born in communities of under 10,000 population in 1870.[5] This is almost exactly equal to the percentage of the total population residing in communities of less than 8,000 population in 1870, but if the population of places of from 8,000 to 9,999 population is added to that of places of less than 8,000 population, the percentage would become larger than that of the rural-born persons, thus showing urban places to be of superior productivity. Huntington's earlier report led to a similar conclusion,[6] as did Spillman's earlier study of United States senators and representives in 1909;[7] Sorokin's study of labor and radical leaders of the United States and Foreign Countries;[8] Holmes' study of 3,238 political leaders listed in *Who's Who in America,* 1924–25;[9] Davis's study of Russian Communist leaders;[10] and Sorokin's study of members of the United States cabinet since 1800.[11]

[4] *Statesman's Year Book,* 1890, p. 522.

[5] Huntington, E., and Whitney, L. F., *The Builders of America,* New York, 1927, p. 341.

[6] Huntington, E., "The Sifting Power of Cities," *Scribner's Magazine,* Vol. LXXX (1926), pp. 516–524.

[7] Spillman, W. J., "The Country Boy Again," *Science,* n. s., Vol. XXIX (1909), pp. 739–741.

[8] Sorokin, P. A., with Hanna, G., Israel, C., McKibben, L. L., Parten, M., Rotnem, M. B., Tanquist, M., and Eddy, E. N., "Leaders of Labor and Radical Movements in the United States and Foreign Countries," *Social Forces,* Vol. III (1925), pp. 627–640.

[9] Holmes, R. H., "A Study in the Origins of Distinguished Living Americans," *American Journal of Sociology,* Vol. XXXIV (1929), pp. 670–685.

[10] Davis, J., "A Study of One Hundred and Sixty-Three Outstanding Communist Leaders," *Papers and Proceedings of the American Sociological Society,* Vol. XXIV (1930), pp. 42–55.

[11] Sorokin, P. A., and Zimmerman, C. C., *Principles of Rural-Urban Sociology,* New York, 1929, p. 254.

The evidence seems fairly conclusive but, since most of these investigations were based on the present generation and the remaining ones were rather fragmentary, it would be valuable to know if Spillman's conclusions would be borne out by a study of a more extensive group of nationally prominent political leaders in various periods of American history.

It is now possible to report such a study, based on the *Biographical Directory of the American Congress, 1774–1927*. By methods of random sampling, a proportionate number of cases in order of entry in the *Directory* were selected from each of the 26 letter classifications, a total of 2,000 cases constituting the sample. A total of 114 were eliminated from the final computations because they were born prior to 1790 when no reliable population data were available for calculation of population ratios, or of population of place of birth. The remaining 1886 cases then were classified as to the urban and rural character of the place of birth, all communities of 8,000 or more population at the time of birth of the men being classified as urban and all others as rural. A total of 1586 proved to be rural-born, while only 300 were urban-born, the respective percentages being 84.1 and 15.9.

Since the data covered a wide range of years and since the cases were not uniformly distributed through the entire period, it was imperative to group the cases by periods for the purposes of computing ratios between the number of leaders born in each of the two types of population group and the size of the population group. Groupings of cases by decades would have given more accurate ratios but the number of cases in the sample hardly justified this number of divisions. Three periods were actually employed, the first or early period including persons born between the years 1790 and 1829, inclusive; the middle period those born between the years 1830 and 1859, inclusive; and the late period those born after 1860. Then census data on percentage of rural and urban population for 1830 were used to compute the ratios for the first

period; the 1850 census data were used for the middle period; and 1880 data for the late period.[12]

The number of members of the Congress per 100,000 population for the rural and urban population for the three periods are presented in Table I. It should be noted that the urban

TABLE I

Number of Rural- and Urban-Born United States Political Leaders per 100,000 Population, 1790–1900

PERIODS	PLACE OF BIRTH			
	Rural		Urban	
	Number	Number per 100,000 population	Number	Number per 100,000 population
1790–1829 (1830 census) ..	696	5.8	111	12.8
1830–1859 (1850 census) ..	562	2.7	90	3.1
1860–1900 (1880 census) ..	328	.84	99	.87
Whole Period (1790–1900) ..	1586	3.11	300	5.59

population surpasses the rural during each of these periods, but that only in the early period is the difference large enough to be significant. The average for the three periods is not as reliable an index of the true conditions as the figures for the separate periods because the actual number of cases in the early period was smaller than the total for the other two. In spite of this fact, the study clearly shows, first, that the rural advantage discovered by Spillman does not hold for members of the Congress, and, second, that the urban population surpasses the rural in a type of political leadership and at periods of our history that had not been thoroughly examined hitherto.

The urban superiority for the first period and for the total period would remain even if these crude ratios were refined

[12] These "periods" have no historical significance and were used only in order to increase the accuracy of the comparisons.

by the use of population statistics standardized for age and sex.[13] Standardization in this case will not improve the productivity of the rural population. It is mainly the younger age groups, in which the rural population outnumbers the urban, that will produce the leaders of the next generation. This means that the rural population, which has the most potential leaders, produces the smallest ratio of leaders, whereas the urban population, with a smaller number of potential leaders, still produces more than its expected quota. Standardization for age, as a matter of fact, would cause the rural population to show up even worse than the figures given above indicate.

As to the correction for sex, this does not enter the question. In the earliest years, the sex ratio of rural and urban populations is not as greatly different as it is later, and consequently neither the rural nor the urban population is at a disadvantage when crude statistics on population are employed. But where there is a difference in sex ratio it will again give the rural population more potential leaders, since political leaders, as well as leaders of all sorts considered together, are predominantly males and the rural population as a whole is predominantly male. Any attempt at correction of the conclusions for differences is sex distribution of the two populations will only prove a greater superiority of the urban population.

The relative quality of the rural and urban leaders was also considered. As can be seen from Table II, the rural and urban populations were not greatly different in quality of men, as determined by length of service. A larger percentage of urban representatives served more than 13 years than was true of the rural; but a larger percentage of rural senators served more than thirteen years than was true of the urban senators, and the same was true of the men who served more than seventeen years in both houses of the Congress. This indicates a slight

[13] Giese, *op. cit.*, first presented conclusions which gave consideration to the necessity of standardization of statistics for all rural and urban comparisons.

TABLE II

Percentage Distribution of Rural and Urban Political Leaders Classified by House of Congress and Length of Service

MEMBERSHIP IN WHICH HOUSE OF CONGRESS	TERM OF SERVICE, IN YEARS	DISTRIBUTION ACCORDING TO RURAL AND URBAN ORIGINS			
		Rural		Urban	
		Number	Per cent	Number	Per cent
Representatives	One term or less—0 to 2 years	520	32.8	90	30.0
	Two to six terms—3 to 12 years	748	47.2	136	45.3
	Seven terms or more—13 years and over	86	5.4	23	7.7
	Total Representatives	1354	85.4	249	83.0
Senators	One term or less—0 to 6 years	96	6.0	21	7.0
	Two terms—7 to 12 years	35	2.2	12	4.0
	Three terms or more—13 years and over	17	1.1	1	.3
	Total Senators	148	9.3	34	11.3
Representatives and Senators	One term as each or less—0 to 8 years	18	1.1	6	2.0
	Length of service 9 to 16 years	36	2.3	7	2.3
	Length of service 17 years and over	30	1.9	4	1.3
	Total for those serving in both Houses	84	5.3	17	5.6
All Classifications		1586	100.0	300	99.9

rural advantage but in the case of senators serving up to two terms the urban population was superior, and consequently the average production and length of service of senators is about the same, while the advantage of the urban population in the matter of representatives is too slight to have any meaning. There is no justification for giving the differences especial emphasis, both because the differences are so slight and because the phenomenon of political party loyalty and inertia

show how difficult it is to employ mere length of service as a criterion of quality of a political leader's career and achievements.

There is no necessity to look far afield for explanations of urban superiority in the production of political leaders. All but agricultural leaders are either predominantly urban in origin or at least as much urban as rural in origin. Many social conditions make urban residence and contact with urban people factors in attaining eminence. The fact that mobility must take place before the rural-born person can obtain wide enough influence to gain prominence and recognition must also be considered. And the predominantly urban influence in national politics, coupled with inadequate farm and rural representation should be remembered. It is also important to note that farming is the most disadvantageous of industries as a producer of eminent persons, and that the children of farmers have fewer chances for eminence than children of persons in many other occupations, including all of the urban classes which are superior according to existing economic and occupational scales. All things considered it is not at all surprising that the cities surpass the rural districts as places of origin of political leaders. We should even expect a greater urban superiority except for the still fairly democratic and pioneering nature of the United States, the fact that the population of open country regions and small towns has not yet been robbed of all its able stock, and the fact that the surplus of population of these groups seeks urban residence where some of these rural-born persons gain political prominence.

As to the future of the rural-urban production of political leaders, it is only possible to hazard a guess. But it is important to observe that the production by the rural and urban populations has remained about the same for a long time. The fact that religious leaders and less important educators are produced about equally by the rural and urban populations should also be remembered. In view of these facts, it seems likely that any type of leader which is needed about equally

by both urban and rural populations, and which is selected by both types of population, is likely to be produced almost equally by the two populations. If this principle proves upon further examination to be a true one, then we may expect almost equal production of political leaders by both rural and urban populations in any country where representative democracy flourishes, although there will always tend to be a slight urban superiority, due to the growing domination of urban culture over the purely national culture in every country.

A PRACTICAL FORM OF THE GIRLS MECHANICAL ASSEMBLY TEST

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THE I. E. R. Girls Mechanical Assembly Test was devised by the Institute of Educational Research at Teachers College, Columbia University, for the purpose of measuring manual aptitude of girls, somewhat as the Stenquist Assembly Test does that of boys.

The original Test consists of eleven items:

A, Stringing Beads
B, Inserting Tape
C, Rosette
D, Cross-stitch
E, Key Ring
F, Clips
G, Tape Sewing
H, Trunk Tag
I, Card Wrapping
J, Booklet
K, Cut-out

Each item includes a completed "sample" and the parts necessary for the construction of the item "like the sample."

This study deals only with certain problems of administration and not with the predictive value of the test as an indicator of success or failure in industrial jobs. As far as can be, without a decrease in predictive or differentiating value, a test should be easy to administer, to score and to reorganize. Practical use of the Girls Mechanical Assembly Test with 470 girls in the 8th grade of the public school and with about 1300 girls at the Vocational Adjustment Bureau has demonstrated that this test, as originally constituted, is unnecessarily long, contains some items difficult to score objectively and uniformly, and requires a disproportionate amount of time for replacement and reassembling. It is desirable, therefore, in order to facilitate the practical use of the test, to omit those items which present the greatest administrative difficulties, if this can be done without diminishing to an appreciable degree the differentiating value of the test.

Much of the difficulty has appeared in connection with the items H (Trunk Tag) and J (Booklet). In the case of item H, the particular model upon which the test was originally standardized is no longer manufactured and it has been necessary to substitute another model. While the substitute model so closely resembles the original that it probably does not affect the difficulty of the item, this point would need to be determined by experimentation if the item were to be retained. A much more serious difficulty arises from ambiguous scoring directions which are variously interpreted by scorers who are otherwise experienced and expert. For instance, credit is allowed on the basis of a "lower" strap, and for certain positions of the straps as related to an "upright" buckle.

The first objection to item H—impossibility of exact replacement of parts—does not hold for item J, as all parts of this item are of standard stock, readily obtainable. However, the scoring is even more liable to variations, as subjective judgments of quality of performance are involved, as where credit ranging from 0 to 3 is allowed according to the degree of approximation to equality of size and the parallelism of the edges of the hinges when cut.

Such difficulties are not insurmountable, but our study shows that these items are not of sufficient value to the total test to warrant the time and effort which would be required for their revision and standardization.

The technique used to determine whether these troublesome items could be eliminated without undue loss of predictive value was the selective multiple ratio correlation formula devised by Dr. Herbert A. Toops.[1] This was applied to the correlations of each item with the total score and the intercorrelations of the items. Briefly, this method, based on a revision of the formula for multiple correlation, allows a selection to be made from several variables of the one variable which con-

[1] Toops, Herbert A.: Tests for Vocational Guidance of Children Thirteen to Sixteen, Bureau of Publications, Teachers College, Columbia University, 1923, Appendix III. See also: Garfiel, Evelyn: Measurement of Motor Abilities, Archives of Psychology, Columbia University, 1923.

tributes most to the total scale at any given point in the scale construction.

There were available for analysis the detailed scores on the Girls Mechanical Assembly Test of 470 8th-grade girls, and also those of approximately 1300 girls who had been employed for varying lengths of time in industrial positions. The larger, industrial group was taken for the first analysis, for two main reasons: first, an analysis of a test for manual dexterity would probably be more valid when based upon scores for an actual industrial group rather than on those from an academic group such as the schoolgirls; and, second, the large population of the industrial group insured a statistical reliability for any obtained results. (When N is 1300, an r of .10 would have a probable error of .02, which is only one-fifth the value of the coefficient.)

Table I gives the correlation of the scores on each item with the total score, and the intercorrelations of the items, for the industrial group.

TABLE I

Intercorrelations of the Girls' Mechanical Assembly Test Items; Industrial Group. N = (av.) 1300

	TOTAL	A	B	C	D	E	F	G	H	I	J	K
Total	—	.46	.38	.52	.65	.51	.47	.63	.60	.68	.56	.62
Item A	.46	—	.15	.28	.31	.13	.17	.24	.19	.26	.20	.21
B	.38	.15	—	.26	.21	.18	.10	.20	.17	.16	.19	.17
C	.52	.28	.26	—	.31	.21	.18	.28	.22	.27	.19	.20
D	.65	.31	.21	.31	—	.29	.31	.39	.30	.37	.27	.35
E	.51	.13	.18	.21	.29	—	.17	.28	.27	.28	.25	.21
F	.47	.17	.10	.18	.31	.17	—	.23	.23	.32	.13	.21
G	.63	.24	.20	.28	.39	.28	.23	—	.31	.40	.34	.39
H	.60	.19	.17	.22	.30	.27	.23	.31	—	.37	.30	.28
I	.68	.26	.16	.27	.37	.28	.32	.13	.27	—	.36	.39
J	.56	.20	.19	.19	.27	.25	.13	.34	.30	.36	—	.38
K	.62	.21	.17	.20	.35	.21	.21	.39	.28	.39	.38	—

The P.E.$_r$, when N is 1300, varies from .02 for an r of .10 to .01 for an r of.68. The variation in N is unimportant, as the range is from 1100 to 1400 cases and the P.E.$_r$ changes only in the third decimal place.

Applying to these correlation coefficients the selective technique mentioned above, and deliberately omitting items H and J, the successive combinations of items correlate with the total score as shown in Table II, in which the tests are arranged in order of decreasing contribution to the total combination.

TABLE II

Correlation of Successive Combinations With the Total Score

	R WITH TOTAL
Item I	.68
I+D	.81
I+D+K	.86
I+D+K+C	.89
I+D+K+C+G	.91
I+D+K+C+G+F	.92
I+D+K+C+G+F+B	.93

The correlations of the items with the total, and the intercorrelations of the items, in the case of the 470 8th-grade

TABLE III

Intercorrelations of Girls' Mechanical Assembly Test Items; Pupil Group. N = 470

	TOTAL	A	B	C	D	E	F	G	H	I	J	K
Total	....	.39	.36	.52	.42	.33	.48	.45	.56	.57	.46	.44
A	.39	....	....	....	....	....	....	....	....	....	....	....
B	.36	....	....	.09	.16	....	.07	.10	....	.09	....	.11
C	.52	....	.09	....	.22	....	.16	.17	....	.15	....	.02
D	.42	....	.16	.22	....	....	.24	.18	....	.08	....	.02
E	.33	....	....	....	....	....	....	....	....	....	....	....
F	.48	....	.07	.16	.24	....	....	.13	....	.13	....	.14
G	.45	....	.10	.17	.18	....	.13	....	....	.17	....	.16
H	.56	....	....	....	....	....	....	....	....	....	....	....
I	.57	....	.09	.15	.08	....	.13	.17	....	....	....	.32
J	.46	....	....	....	....	....	....	....	....	....	....	....
K	.44	....	.11	.02	.02	....	.14	.16	....	.32	....	....

This table shows the correlations of each item with the total, but the intercorrelations of only those items retained in the shortened form of the scale.

(P.E., when N is 470, varies from $r = .02 \pm .03$ to $r = .57 \pm .02$.)

school girls varied somewhat from those of the industrial group, but a combination of the same items by means of the same selective technique yielded nearly identical final results.

The "built-up" combination based on the scores of the 470 school girls is shown in Table IV, in which the items are arbitrarily arranged in the same order as in the case of the industrial group.

TABLE IV

Correlation of Successive Combinations With the Total Score

Pupil Group: N = 470

	R WITH TOTAL
Item I	.57
I+D	.68
I+D+K	.73
I+D+K+C	.82
I+D+K+C+G	.86
I+D+K+C+G+F	.89
I+D+K+C+G+F+B	.91

Items H and J, it is evident, do add some value to the total scale, but it is doubtful if their contribution is great enough to justify the labor necessary for their revision in case they were retained. The other two items omitted, Item A (Stringing Beads) and Item E (Key Ring), add practically nothing to the value of the scale, and with these two items also there are sound administrative reasons for their omission.

In the original construction of the test battery,[2] Item A (Stringing Beads) and Item B (Inserting Tape), were of nearly the same degree of difficulty. Each was so easy as to be considered a good "buffer" test to establish self-confidence, and perhaps interest, in the subjects before attempting performances on the more difficult items. For this purpose, one of these items should be retained in the shortened scale. There are at least two practical reasons for retaining Item B rather than Item A.

[2] See: Tests for Vocational Guidance of Children 13 to 16, pp. 41–42.

In the first place, the nature of Item A, with a dozen loose beads, requires a box as a container, rather than an envelope which is adequate for the other items. This requires that the test as a whole have a larger, less compact, container than would be necessary for envelopes alone, thereby increasing the cost of the test, while decreasing the facility of its handling. Furthermore, Item A involves an element of color recognition —or its opposite, color blindness—which is not present in the other items. The main administrative direction for each item of the test is to "make it like the sample," and is intended to measure to some extent the ability of the subject to observe and to follow directions. There are many industrial situations into which the color-recognition element would not enter, but where the ability to follow directions would be of paramount value. On the other hand, there are industrial situations in which the color recognition would be extremely important. There is nothing in Item A, as a part of this particular battery of tests, which gives any indication as to whether a low score on this item is due to inability to follow directions, or whether there is a visual defect such that the subject is not aware that she is not making it "like the sample." It would seem necessary then, if Item A were to be retained, to add to the test battery some further item which would give a check on the color-recognition ability of the subject. While much less incidence of color-blindness is reported for girls than for men,[3] there is evidence that it does exist, to some unknown extent, and it is well to omit from a measure of manual dexterity this Item A which definitely involves color-recognition.

The administrative objection to Item E (Key Ring) is one pertaining to the distribution of scores on the item, which tend to cluster around the points 0, 5 and 10. While this is a less serious difficulty than those involved in Items A, H and J, and might be more easily overcome than the difficulties of those three items, it is unnecessary to include Item E, as it

[3] Miles, W. R.: One Hundred Cases of Color-blindness Detected with the Ishihara Test. Journ. of Ed. Psych. No. 2, 1929, pp. 535f.

contributes very little to the total, and one objective in constructing a shortened scale is to reduce the time necessary for administration as well as for scoring and reassembling.

As originally standardized, an over-all time limit of 45 minutes was set for the test. This was determined after an examination of the performance-times of a class of schoolgirls, but has proved to be a longer time than is required for girls and women with some industrial experience. Of a group of 24 women, varying in age from twenty to forty-five, in a children's dress manufacturing plant, all but one completed the test in 26 minutes or less. The other one, who asked to be allowed to work the entire 45 minutes, did not increase her score by a single point by her work beyond the 26 minutes, The 1300 industrial girls upon whose scores our study is based were given the test without time limit, but the time used by each one on the test was recorded. These times ranged from 15 minutes to 180 minutes, with the average about 30 minutes. There is practically no correlation between time-on-test and score-on-test, (.07), $n = 1300$. For practical administrative purposes, a time limit of 30 minutes might be allowed for the shortened scale. This would cover all the time desired by the majority of subjects, and would insure the possibility of administering, scoring and reassembling the test within a period of one hour. This has administrative advantages.

In those situations where it is desirable for purposes of emotional satisfaction to allow the subject more time, the score at the end of 30 minutes should be recorded, and a record should be made also of the length of time required for completion, or for as much of the test as the subject feels able to do. In view of former experience, it is doubtful if many subjects would gain higher scores by the lengthened time, but in some cases where they believed they could do more by having more time it might be of value in other ways to allow them all the time desired.

The use of the Girls Mechanical Assembly Test for measuring some values other than mere total score on the test is now

being studied, with the items of the shortened scale grouped according to industrial operations which they resemble:

Group 1: B (Inserting Tape) and
C (Rosette)
Both of these operations are similar to simple factory jobs in assembling.

Group 2: D (Cross-stitch) and
G (Sewing a piece of tape on a strip of unbleached muslin)
Both of these operations measure a girl's facility with the use of a needle.

Group 3: F (Assembling Clips) and
I (Wrapping a string about a card in a prescribed manner)
Both of these tasks are analagous to certain industrial processes in difficult assembling.

Group 4: K (Cut-out, or Trimming)
This is an operation corresponding to several tasks frequently demanded in factories.

Various types of work are, therefore, still included in the shortened scale, although four test items have been eliminated. After the establishment of critical scores for employees in various types of jobs requiring manual dexterity, this shortened form of the scale should facilitate the use of the I. E. R. Assembly Test in the differentiation among applicants for such jobs.

This scale should not be expected to act as a substitute for a job-operation test on a specific task, but as a measure of the ability of the subject to "work with her hands." Such use of the Girls Mechanical Assembly Test is economically valuable as a saving of time and effort for both employer and employee.

STEADINESS AND RIFLE MARKSMANSHIP

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THE present study is a verification and extension of the work of Seashore and Adams (11) and of Spaeth and Dunham (12). Seashore and Adams administered a battery of steadiness tests (Miles ataxiameter (9), Beall and Hall ataxiagraph (1), the Seashore modification of Whipple steadiness test (14) for both "position" and "thrusting" steadiness, and Adams' modification of the Gates (5) rifle steadiness test) to an average of fifty unselected subjects. The intercorrelations of the steadiness test scores ranged from +.44 to +.59, the median being +.48. This level of intercorrelation was interpreted as being indicative of a "general steadiness factor." Six members of a university rifle team were also tested and compared with the unselected group. With but one exception, the rifle team members surpassed the steadiest person in the unselected group. On the individual test the riflemen placed consistently at the level of the 8th, 9th, and 10th deciles of the unselected group. The ranks of the riflemen on the steadiness battery coincided "almost perfectly" with their ranks in actual intercollegiate competition. Spaeth and Dunham tested seventy-three U. S. Army marksmen, ranging from "expert" to "unqualified" in classification. They used the Dunlap modification (3) of the Whipple Steadiness Test (14). The rank-order coefficient of correlation between steadiness scores and target scores was $+.61 \pm .11$. As they pointed out, this may be because practice on the rifle range improves steadiness, or because steadiness underlies the development of skill in rifle shooting. Fearing (4) and others have shown that practice in a steadiness test produces improvement in such per-

[1] The study was carried on under the direction of Dr. Taylor. Mr. Buxton assisted with the testing and statistical treatment. Acknowledgments are also due Dr. R. H. Seashore for pertinent suggestions.

formance. Belton, Blair, and Humphreys (2), using the same battery of tests as Seashore and Adams, found that practice over a ten-day period produced improvement, but, when compared with the entire range of individual differences of fifty cases, the average improvement on the battery was very small—only .4 sigma. Since a direct training period ten times as long as that used in testing produced so little improvement, it seems doubtful that transfer in training from rifle shooting could explain the superior steadiness of riflemen on the tests.

These suggestions of a "general factor" underlying the development of certain types of skill, if verified, have so many important implications for both theoretical and practical work that a repetition of them and further analysis seemed desirable. Our test battery[2] included the Miles ataxiameter (postural steadiness); the Seashore modification of the Whipple steadiness test for both "stationary" and "thrusting" steadiness; and a rifle steadiness test. The scoring procedures used by Gates and by Seashore and Adams for rifle steadiness were laborious. Therefore we constructed a light wooden frame, 12′ by 12′, which was placed vertically in the center of a Miles ataxiameter. Within this frame the barrel of the rifle was placed, and by means of guides which redirected the course of the ataxiameter threads into the vertical plane to a peg in the gun-muzzle, the sway of the barrel in vertical and horizontal directions was recorded on the four dials of the ataxiameter. Thus the amount of gun sway was easily and quickly determined. As Seashore and Adams had used the ataxiameter in scoring their records and as we used the same testing procedure, we have assumed that the two tests are essentially similar.

The following test cycle was administered twice within an hour period: (1) ataxiameter, two trials of two minutes each, with a short rest period between trials; (2) thrusting steadiness, ten trials at each of eleven successively smaller holes,

[2] We are indebted to Seashore and Adams for both apparatus and procedure.

starting with the largest, and with a short rest period between the sixth and seventh holes; (3) stationary steadiness, ten seconds in each of eleven successively smaller holes, starting with the largest, with a short rest period between the sixth and seventh holes; (4) rifle steadiness, two trials of fifteen seconds each, with a short rest period between trials. Uniform instructions were given to all subjects and each was informed of his score throughout the tests as a means of motivation.

Subjects for the present investigation included the following: the national championship 5-man rifle team of the University of Oregon; the eleven men ranking next in order below the first five; thirteen third-year military students; and fourteen first-year military students. Motivation was maintained at a high level because of the competitive spirit existing in the above named groups.

RESULTS

The reliabilities and intercorrelations of our measures of steadiness appear in Table I. Reliability coefficients[3] were obtained by correlating results on each test in cycle 1 with results in cycle 2, taken during the same period of testing. Since the test length is thus shortened by half, the Brown-Spearman formula for estimating the reliability of a complete test performance was applied. Estimated reliabilities and coefficients corrected for attenuation are shown in parentheses.

TABLE I

Reliabilities and Intercorrelations of Steadiness Tests

N = 43

	THRUSTING S.	STATIONARY S.	ATAX.	RIFLE S.
Thrusting S.	+.78 (.88)	+.65 (.89)	+.39 (.43)	+.37 (.41)
Stationary S.		+.43 (.60)	+.52 (.70)	+.55 (.73)
Ataxiameter			+.86 (.92)	+.69 (.72)
Rifle S.				+.89 (.94)

[3] Reliability coefficients for two such cycles are probably a little lower than for strictly random halves of a single performance.

It is quite evident that a single hour of testing provides a fairly consistent sample of such performance, with the exception of the stationary steadiness test. In this test, a perfect score on ten holes may be made very poor by a slip on the last hole as the Cenco counter records a large score in a very short time. There was also a grouping of perfect and near perfect scores which could be eliminated by the use of one or two smaller holes. Conceivably, this might improve the reliability of the test.[4]

As for the intercorrelations of the tests, the median coefficient (uncorrected) lies between .52 and .55. This is much higher than the central tendency for intercorrelations of motor skills in general, which is set by Seashore (10) at +.25. Our findings, based on a selected group taking military training, verify in general those of Seashore and Adams on an unselected group; *viz.*, the data indicate a "steadiness factor" or a "steadiness aptitude." The chief discrepancies, and they are not great, are the correlations of rifle steadiness with the other tests. Although our rifle steadiness test is, *a priori*, very similar to that of Seashore and Adams, the differences in the intercorrelations may be due to some dissimilarity in the tests or, on the other hand, they may be due to chance fluctuations in relationship, due to the small number of subjects used in both experiments.

When the above coefficients are corrected for attenuation the suggestion of a "steadiness factor" is even more definite. There is quite a high degree of commonality between three of the tests. The fourth, thrusting steadiness, is probably much more complex than any of the other tests, involving an eye-hand coördination in addition to absence of tremor; but stationary steadiness, using the same apparatus, correlates closely with it.

[4] An increase in reliability from +.43 to +.52 was obtained when scores were weighted according to the size of the hole. However, the correlations with the other tests did not change materially and the change was not consistent: *i.e.*, some were raised and some were lowered.

When our subjects were divided into two groups of sixteen rifle team members and twenty-seven non-riflemen and the group differences computed for the various tests, it was found that there was only one test, stationary steadiness, on which the two groups were not differentiated with almost complete certainty. In addition, in comparing our two groups with the unselected group of Seashore and Adams, it was found that both the riflemen and non-riflemen were much steadier than unselected college men. The standard deviations in every test are considerably smaller than for the group studied by Seashore and Adams. This makes the high correlation described below between steadiness and marksmanship in such a restricted range all the more significant.

The men of the rifle squad proper were rated for their marksmanship by their coach,[5] in order from 1 to 16 on the basis of their season's record. The remaining twenty-seven men were rated in four groups, judgments being on the basis of shorter practice periods on the range. The group rated just inferior to the sixteenth man on the rifle team contained eleven men, the next, five, the next, eight, and the last, three. Since the above ratings were not suitable for correlation with our steadiness battery, it was decided to transmute the ratings into sigma scores by Thurstone's method (13).

As a rough measure of differences in training, each subject was asked to rate himself as to rifle shooting experience. For this purpose an 11-step scale was constructed. Zero denoted "no previous experience" and 10, the amount of experience had by the captain of the rifle team. He had had four years of intercollegiate competition, four summers of C. M. T. C. competition, one summer of National Guard experience, and considerable hunting experience. Examples were also given for various other intervals on the scale. In this way an estimate of rifle shooting experience for each subject on a fairly objective basis was obtained.

[5] We are indebted to Sergeant H. G. Blythe of the University of Oregon ROTC unit for all ratings and for willing cooperation in the testing program. Because of his experience and close contact with the men, his ratings are probably as accurate as any which could be secured.

In Table II appear the correlations of the four measures of steadiness with the criterion (rifle ratings transmuted into sigma scores) and with experience, also the multiple correlation of the battery with the criterion. Beside each coefficient in parentheses is the estimated correlation between this fallible criterion and perfect measures of the abilities sampled in each test and the battery as a whole (8).

TABLE II

Correlations with the Criterion and with Experience

N = 43

	THRUSTING S.	STATIONARY S.	RIFLE S.	ATAX.	EXP.	BAT.
Crit.	+.33 (.35)	+.57 (.74)	+.72 (.72)	+.47 (.49)	+.72	+.77 (.79)
Exp.	+.28 (.32)	+.40 (.52)	+.59 (.61)	+.27 (.28)		

The correlation between the battery and the criterion was obtained by the multiple correlation procedure of Griffin (6). In determining the reliability of the whole battery the scores on each cycle of each test were weighted according to the relative size of the "betas" obtained in the above multiple correlation. The self-correlation of the two halves of the battery weighted in this way was $r = .90$, which gives an estimated reliability of $r_{11} = .95$.

The above results corroborate those of Spaeth and Dunham; *i.e.*, marksmanship can be predicted to a considerable extent at least, from steadiness. Their rank-order coefficient of correlation, rho = +.61, between stationary steadiness and marksmanship agrees quite closely with our result, $r = .57$, for similar variables. When steadiness is tested under "work sample" conditions of holding a rifle the correlation with the criterion is considerably higher, $r = .72$. It is quite apparent from ($R_{1.2\,3\,4} = .77$) that the other measures of steadiness add but little to the predictive efficiency of the best single test, *i.e.*, rifle steadiness. In this group of marksmen experience is also as prognostic as rifle steadiness, probably because of the association between the latter and experience whatever the underlying reasons may be.

Nevertheless, when allowance is made for the unreliability of the stationary steadiness test, it correlates as highly with the criterion as the rifle steadiness test which so nearly duplicates the actual target shooting situation. If the former were made more reliable by increasing the number of cycles and, perhaps, weighting errors and adding smaller holes, it would probably be as satisfactory and more convenient to use than rifle steadiness.

The correlation between the criterion (marksmanship ratings) and experience can be explained on either of two bases: (1) a good rifleman becomes such because of practice, or (2) on the whole, people with good capacity for marksmanship like to shoot and tend to specialize in it. At any rate the rifle team composed the upper end of a bi-modal distribution for experience (there was almost no overlapping). They were also the top 37 per cent of the group in marksmanship ratings. However, it seems likely that experience was obtained in most cases as a result of some preliminary selection for marksmanship. In view of the slight practice effects on steadiness already mentioned, an explanation in terms of selection is perhaps preferable; *i.e.*, only men who have considerable aptitude for shooting are likely to do a lot of it. In the same way the correlation between rifle steadiness and experience ($r = .59$) may be due to transfer of training within the limited range of the testing situation and the target-shooting situation or, of course, it could be due to selection.

Smoking is popularly supposed to cause unsteadiness; and Hull (7) for one has reported that smoking increases tremor. For these reasons all subjects were asked to estimate the number of cigarettes smoked in a day. When members of the rifle team were compared with the non-riflemen, it was seen that the members of the rifle team smoked slightly more, but the difference was not statistically certain. However, the rifle team may contain as a result of selection only men unusually resistant to the effects of tobacco. There were twenty-one non-smokers out of the forty-three subjects, divided proportionately between

members and non-members of the rifle team. When the entire group was divided into smokers and non-smokers the non-smokers tended to be steadier on all of the tests as well as superior in ratings for marksmanship, in spite of the fact that both groups were equal in experience. However, the differences were not statistically significant.

In summary: the relatively high intercorrelations of the steadiness test battery point to a "steadiness factor." Individuals tend definitely to hold the same rank in the group on all four of the tests. The correlations between the criterion and the steadiness tests indicate that steadiness as measured here probably underlies marksmanship with the rifle. Whether such steadiness is the result of training or a basic capacity for neuro-muscular coordination can hardly be inferred from these data. Critical evidence concerning the effects of practice upon steadiness and the relation of steadiness to marksmanship would be afforded by testing individuals who have had little or no shooting experience, allowing them equal amounts of practice on the range, and re-testing them on the steadiness battery.

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AN ANALYSIS OF SPONTANEOUS DRAWINGS BY CHILDREN IN DIFFERENT CULTURES

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THE drawings of children, and especially so-called spontaneous drawings in which the child is free to choose his own subject, have been generally recognized as a fruitful field of research for a variety of purposes. In the field of art, exponents of the various contemporary movements to recapture the "naïve" and "unbiased" view-point of the child may profitably study the juvenile artistic product which is to serve as their inspiration. For the teacher and especially for those concerned with the art education of the child, intimate acquaintance with the drawings of children at different ages is obviously of pedagogical value. The child psychologist has shown continued interest in the child's drawing behavior, from his earliest aimless scrawls to the elaborately executed and highly organized picture. The drawing response in this case takes its place along with the child's other behavior manifestations as an index of general mental development. The elaborate analyses of Goodenough (8) are an example of the diagnostic value sometimes attributed to this one type of behavior, which in this case is regarded as a sufficient index of general mental level or "intelligence." The spontaneous drawings of the child have also been regarded as indicative of his interests, attitudes, and other emotional or social characteristics. The general psychologist finds in the genetic study of drawing behavior a possible clue to the nature of various related processes, such as perception and thinking. Social and "folk" psychologists and historians have occa-

sionally theorized on the possible relations between the drawings of children and of primitive man. It was interest in this question that stimulated the remarkable efforts of Lamprecht (14) and his associates to collect approximately 40,000 drawings by children from all countries of the world. Such comparative studies of drawings by children in different cultural milieux throw light on another important question which has usually been overlooked or mentioned only incidentally, namely, the influence of environment on the nature and developmental sequence of drawing behavior. Any generalizations and practical applications derived from the study of children's drawing seem indeed to be contingent upon the solution of this problem.

It is beyond the scope of the present paper to survey the general literature on children's drawings. For summaries of a large portion of this material, the reader is referred to the works of Ayer (1), Goodenough (8, 9, 10), and Meier (22). An examination of this extensive literature will at once reveal the wide-spread belief in the existence of definite developmental stages in drawing behavior. These stages are regarded as products of innate maturational factors and independent of specific environmental stimulation. The data supporting such maturational views are not only often inadequate and inconclusive, but the conclusions drawn are frequently inconsistent with the facts obtained. It would seem to the writers that the various stages of drawing behavior can most profitably be studied in the cases of children reared in widely different cultures. The most relevant literature concerning genetic stages as well as drawings by children from different countries will be summarized below.

Kerchensteiner (13) was among the first to describe definite developmental stages in drawing behavior. Following the study of nearly 100,000 drawings by schoolchildren in Munich and its environs, he formulated three stages of development: (1) purely schematic drawings, without regard to perspective or angle of observation; (2) drawings in which an attempt is

made to represent the object as it looks; (3) realistic drawings in which the further attempt is made to represent perspective and give an idea of three-dimensional space. Kerchensteiner also recognizes, however, certain "mixed" types in which parts of a drawing can be classified in one stage and the remainder in another stage.

Luquet (17) recognizes four stages in the development of children's drawings, viz.: (1) *involuntary drawing,* in which the child makes lines with no attempt at control, but may notice accidental similarities to objects and name his drawing accordingly; (2) *synthetic incapacity,* referring to the child's first attempts to represent the visual appearance of objects, in which he is handicapped by inability to organize the different details of an object into a coherent whole; (3) *logical or intellectual realism,* in which the child deliberately draws objects about him as he knows them to be rather than as he sees them, such as drawing both eyes in a profile view or showing rooms in an external view of a house; (4) *visual realism,* in which objects are drawn as they look, with regard also to laws of perspective, etc. Piaget (24) claims that the transition from intellectual realism to visual realism is not limited to drawing but characterizes all of the child's mental processes. He states: "Now this intellectual realism has a significance which . . . extends beyond the sphere of drawing . . . this reality to which he clings so continuously is the outcome of his own mental construction rather than the fruit of pure observation. The child sees only what he knows and what he anticipates . . . one is struck by the extent to which his vision is distorted by his ideas . . ." (p. 183).

Rouma (26) describes four developmental stages in the graphic representation of motion. These he calls: (1) *neutral,* in which the child draws a stereotyped, static representation of the object and announces motion verbally, as by saying, "the man runs;" (2) *relative,* in which movement is shown by some form of relationship such as a line drawn from dog to house to show that the dog is going to the house; (3) *partial,*

in which the movement is partially indicated such as by drawing a raised leg to indicate running, while the rest of the figure is stationary; (4) *complete,* in which the entire drawing depicts motion. Rouma has also analyzed the genetic development of the representation of the third dimension and distance into five stages and the portrayal of the human figure into six stages. The latter has also been investigated by Partridge (23) with American children.

Levinstein (15) tabulated 4,943 illustrations of the story *Hans-Guck-in-die-Luft* drawn by German schoolchildren 14 years of age or under. He distinguished two types of drawing: (1) *Fragmentbilder,* in which isolated figures are drawn without organization; and (2) *Erzählungbilder,* or narrative pictures, showing a coördinated scene and arranged in chronological order. The latter, according to Levinstein, begins at 9 or 10 years of age and constitutes the chief type of illustration by 11- or 12-year-old children. Rouma (26), investigating the drawing responses of children in Belgium and Switzerland by a similar method, found that the second stage replaced the first at an earlier age than that given by Levinstein. Barnes (4) analyzed 6,393 drawings made by American schoolchildren between the ages of 6 and 16 to illustrate an English version of the same poem. Although primarily interested in the particular incidents chosen by the child for illustration, Barnes draws a number of conclusions regarding the drawings themselves, among which are the following: children like to draw large distinct figures, expressed with few lines; children naturally adopt symbols and conventional forms to express what they want to say; the number of different illustrations drawn by each child increases until the ages 13–14, then decreases steadily; full face views predominate until the age of 9, profiles after that.

An example of the wide-spread influence of the above theories is to be found in Tomlinson's recent book, *Picture making by children* (28), written from the view-point of the art teacher. Regarding the contributions of the psychologist,

Tomlinson writes: "... it is desirable that the psychologist's conclusions be briefly considered, as they have had such an important influence upon the work which is being done today. It simplifies matters to find that all authorities agree that children, in their reactions to art, pass through certain stages of development" (p. 14). He then proceeds to outline four such stages, giving the age limits of each. Tomlinson's own position on the question may be seen in the following sentence: "One of the most arresting features of this book is the attention it calls by means of the illustrations to the similarity of both the impressions and expressions of children all over the world; due no doubt to that spontaneous creativeness which knows no historical or geographical limits and has been justly termed the Eternal Art" (p. 9). It might be added that the illustrations in the book do not seem to the writers to support such a conclusion.

Several investigators have classified the spontaneous drawings of children with respect to *subject matter,* and have often attempted to show developmental stages in the type of objects drawn at successive ages. Maitland (18) collected 1,570 drawings* by California schoolchildren between the ages of 5 and 15, and classified the subjects of the drawings roughly into eight categories. The most clear-cut finding was the predominance of the human figure in the drawings by the younger children, and the marked and steady decline of this subject in the older groups until at ages 14–15 it has the second lowest frequency. Geometric design rose steadily in popularity, finally reaching first place at ages 14–15. Houses, plants, and animals all decreased in popularity with age. Still life had a high rank at all ages. The other classes of drawings did not occur in sufficient number at any age to warrant much consideration. Gallagher (7), studying the drawings of 100

* The term "drawing" will henceforth be used in a general sense to include painting, crayon drawing, pencil sketch, or any other type of picture. Unless otherwise indicated, all drawings are "spontaneous," *i.e.*, drawing in which the child is free to choose his own subject.

Nebraska schoolchildren, 50 of each sex, at each of the age levels from 5 to 15, found percentage choices of different subjects which were very similar to Maitland's. She also concluded that there was a "loss of spontaneity" with increasing age, as manifested in a decrease in the number of different drawings made by each child and an increase in conventional drawings of the type taught in school. Lukens (16) collected 1,232 drawings by American schoolchildren under the age of 10 and concluded that the same trends were found as those reported by Maitland, "but still more marked" (p. 95). More specifically, 40 per cent of the drawings were primarily representations of the human figure, and if all drawings which contain the human figure, such as story pictures, interiors of houses, battle scenes, vehicles, etc., are included, then fully three-fourths of the drawings can be classified as representatons of people. Animals and plants are shown by 7 per cent and 3 per cent, respectively, story-drawing by 12 per cent, and geometrical figures, ornament, and scribble combined by only 2 per cent.

McCarty (20) obtained a single drawing from each of 31,239 public school children, ages 4 to 8, attending kindergarten or the primary grades. The study covered 26 cities in the United States. All drawings were made in black or brown crayon on 6×9 inch drawing paper. The younger children again showed a preference for human as well as for animal forms. At the later ages, natural objects, houses, flowers, and simple scenes gained in frequency. The drawings also indicated wider and more abstract interests with increasing age. The representation of the human form exhibited a definite developmental sequence in itself. The younger child usually drew the head in front view with eyes, nose, and mouth outlined; there might be little or no neck shown, but the arms and legs were generally drawn; the relative size of the parts of the body was commonly distorted. Profile pictures were found at later ages, sometimes with the attempt to draw both eyes in such a view. Other distortions seemed to result from the tendency to

draw from memory rather than from direct observation. This is also attested by the fact that the children rarely made use of a model, even when one was available. For example, the child would draw a square for a tabletop, even though he was looking at a table from an oblique angle. This tendency seems to correspond to Luquet's "intellectual realism."

Ballard (2) examined nearly 20,000 drawings by London schoolchildren. When all age groups were combined, the order of frequency of different subjects was, for boys: ships, miscellaneous objects, plant life, houses, human beings, vehicles, animals, weapons, landscapes. For girls, the order was: plant life, houses, miscellaneous objects, human beings, animals, ships, vehicles, weapons, landscapes. Ballard stresses the widespread interest in people shown in the drawings of children under 9. The curve for this subject begins high, drops until 9, and then rises slightly until 15. Ballard points out, however, that this gives a somewhat misleading picture, since many of the drawings by children under 9, although classified under a different subject, contain people. Referring to the child under 9, Ballard writes: "If he draws a house, and labels it a house, it is not a mere thing of brick and mortar. Faces peer out of the windows, a man stands smoking on the doorstep, people pass to and fro in front" (p. 187). Ballard regards the age of 9 as critical in many ways. Thus he finds that before this age full face views predominate, after 9 profiles. Before 9 garments are usually only decorative or symbolic; after 9 more attention is paid to details and even current fashion. After quoting similar comments by other writers, he concludes, "that some time about 9 or 10 years of age imaginative drawing tends to pass over to observational drawing" (p. 187). Drawings of plant life were fairly common, especially among girls, who showed an increasing preference for this subject with age until it constituted 40 per cent of their drawings between 9 and 15. Ballard admits, in this connection, the influence of the nature study movement. Ships were the favorite subject for boys between 5 and 12. Houses,

and especially interior views with furnishings, were more popular with girls than with boys. Miscellaneous objects, of the sort used as drawing models in school, were frequent choices by both sexes and show a steady rise after 7. It is interesting to note that landscapes were very infrequent at all ages.

Ballard (3) also obtained for comparative purposes about 10,000 drawings by Welsh children in small town or rural schools of Glamorgan. Although Ballard stresses the essential similarity of results in both studies, he admits the influence of environment in many instances. Thus, more animals than human beings were drawn by the Glamorgan children, the reverse being the case with the London children. Town children frequently represent vehicles, country children rarely. Landscapes were more frequently drawn in Glamorgan than in London. Houses were drawn more frequently by the country children but this also, as Ballard suggests, may "arise from the fact that London children see buildings at such short range and in such conglomeration that rarely do they see a house steadily and see it whole" (p. 129). Among the similarities in results of the two studies, Ballard mentions the fact that "ships" was the most frequent subject drawn by boys. He adds, however: "This peculiar preference rises to enormous proportions at seaside places. At Oystermouth on Swansea Bay nearly a third of the girls drew ships, and more than half the boys" (p. 129).

Katzaroff (12) analyzed drawings by over 2,500 Swiss schoolchildren. The frequency of different subjects was determined for the group as a whole and not for separate ages. Drawings of the human form, found so commonly by other investigators, were made by only 10 per cent of the boys and 7 per cent of the girls. Miscellaneous objects such as furniture and furnishings of home or classroom headed the list for both boys and girls. In this connection, Katzaroff calls attention to the marked influence of environment upon the drawings. In some classes, for example, the children drew only objects in the class-

room at the time. Houses, second in order of frequency for both sexes, were drawn with a remarkable uniformity, all appearing to be made from the same model. Katzaroff's explanation for this is summed up in his statement that, "le dessein des enfants est . . . plutôt un symbole qu'un reproduction de la realité. Il nous montre d'une part que l'enfant dessin plutôt ce qu'il soit et non pas ce qu'il voit" (p. 128). It is surprising that Katzaroff, after himself pointing out the influence of immediate environment, should ignore its influence in the uniformity of design. It is to be expected that Swiss schoolchildren in drawing a house would not sketch a skyscraper, a wigwam, or a domed Moslem palace, but the Swiss houses that they have seen, which are probably quite similar in fundamental design.

Maitland (19) analyzed 65 drawings by Eskimo children under 14 years of age. Some had been in the government school for a few months, but none could read or write English. The planning and execution of the drawings were in most cases superior to that of American children of the same ages. The arrangement was of the "catalogue" variety in 21 per cent of the drawings, frieze or picture-writing in 77 per cent, and portrayal of a single "artistic moment," organized and unified, in 2 per cent. In 76 per cent of the drawings the attempt had been made to tell a story or show a record; 23 per cent were simply representations of objects and 1 per cent of unknown meaning. Motion was portrayed by the attitude of man or animal in 85 per cent of the drawings. Maitland writes: "The first thing that strikes one on considering the drawings is that they are full of action. The figures are all moving energetically and are busily engaged" (p. 447). The subjects drawn were chiefly events of every-day life. Human beings were shown in 48 of the 65 drawings. The occupations portrayed were: hunting and fishing in 29 cases, summer work such as drying fish in 5, winter work such as cooking in 5, dancing in 2, playing ball in 2, driving dogs in 1. "Animals, fish, or birds" (including such characteristic animals as wal-

rus, whale, reindeer) were shown in 47 drawings, being over three times as common as in Maitland's study on California schoolchildren. Implements of hunting, fishing, or cooking were shown in 38 drawings, boats, ships, or sleds in 26, the sea in 18, smoke in 13, houses, huts, or tents in 12, land or ice in 12. It is interesting to note that the sun was only drawn in one case and vegetation in no case.

McDermott (21) collected drawings by 30 American Indian children at each of the ages from 5 to 16 and 30 adults of each sex, a total of 780 subjects from 17 widely separated Indian schools. The most common drawings by 5 and 6 year olds were classified as "crude figures" and "conventional figures." The most popular subjects with boys from 7 to 16 were man, birds, horses, conventional figures, tree; with girls, flower, birds, and conventional figures. The most frequent choices seemed to show no definite change with age. The most common animal form pictured by the boys was the horse, which, as McDermott points out, may be due to the Indian boy's close association with horses. McDermott also states: "The drawings from Tacoma showed water, those from Oneida a timbered country and the logging industry, and many others reflected plainly the local environment" (p. 136).

Probst (25) collected drawings by 53 Kabyle children in Algeria, all of whom belonged to a tribe which was isolated from any contact with Europeans. Of the 53 pictures drawn, 38 were outdoor scenes with people or animals; 10 contained exclusively animals and 3 exclusively people; 2 showed native huts with men or animals. The most common scenes were domestic scenes, such as milking cows or attending to donkeys. Younger children tended to draw animals more often than older children and the animals drawn were those most commonly seen, such as cow, donkey, dog, cat, horse, snake, hedgehog. Drawings of men always included the Mohammedan fez and frequently a beard. Most of the drawings showed remarkable attention to detail. Distortions in the drawings were classified by Probst into two groups: (1) involuntary,

faulty observations usually resulting from peculiarities of local customs; (2) voluntary, typical of the general tendency to decorativeness and stylization in Moslem art. Probst seems to attribute this tendency to hereditary factors, although "social heredity" may have been implied in the following statement: "Elles paraissent confirmer l'opinion des auteurs de travaux sur l'esthétique musselmane, établir incontestablement l'hérédité de tendences à la stylisation, à la déformation de la nature" (p. 135). Examples of the first type of deformation included absence of the neck in 40 drawings of people, although shown in animals, and this was explained as probably resulting from the draperies of the typical Moslem attire which conceal the neck. Ears were usually drawn too large, probably because attention was called to them by the habit of deforming them since early childhood with an oversize fez. Examples of the second type of deformation include human heads on animal bodies or vice versa, birds' heads on quadrupeds or vice versa, multiple tails, etc.

Dégallier (5) collected drawings by 33 Pahouin negro girls belonging to a nomad tribe in French Congo. The drawings are all described as "remarkably similar" and included representations of men, children, birds, cats, fish, and strings of fish. Haddon (11) reports drawings by 5 Papuan boys in British New Guinea, aged about 12. The boys were told to draw simple objects such as man, dog, crocodile, house. All of their efforts were very crude, most of the drawings being schematic and bearing so little resemblance to the objects as to be hardly recognizable. The drawings by a 23 year old youth educated in a mission school were, however, more complete and elaborate, showing, for example, warriors garbed in loin cloths, carrying spears, holding war-charms in their mouths, wearing feathers in their hair, etc. A pile-dwelling and a lagoon characteristic of the district were also drawn.

Schubert (27) reports drawings by 7 Orotchen children and young people, ages 10 to 21. The Orotchen are a hunting tribe of low cultural level living in Siberia. None of the chil-

dren had had any instruction in drawing and only the two oldest could read and write slightly. The most common subjects of the drawings were the reindeer and the elk which it is their custom to hunt and rear. The other subjects, in order of frequency, were wild and domestic animals, men, plants, and surrounding objects. The drawings of reindeer and elks show a remarkable accuracy of form presentation and the drawings of animals in general are superior to drawings of other subjects. No evidence was found, in the analysis of successive drawings by the same child, for the presence of a preparatory stage of schematic drawing. The drawings were naturalistic and differed in this respect from the symbolical, schematic, conventional drawings ordinarily reported for children. The objects were usually arranged in the form of a frieze and in only a few cases scattered over the paper. Schubert calls attention to the fact that these drawings "are by children of a hunting tribe, the peculiarities of which—with respect to sharpened visual perception, manual dexterity, and observation—probably had an influence on the perfection of the form of the objects represented, especially of the objects which had to do with the hunt" (p. 241).

THE PRESENT STUDY

The 602 drawings which served as material in this study formed the major part of an International Exhibition of Children's Paintings,* held in the R. C. A. Building, Rockefeller Center, New York City, from November 13 to December 1, 1934, and sponsored by the Little Red Schoolhouse, New York City. The drawings in the exhibition were selected from work submitted by over one thousand children. A large number of individuals and agencies coöperated in the collection of the drawings. Forty-one countries were represented, and the drawings were limited to work done by children between the ages of 6 and 12. This rule was adhered to with the following

* The writers are indebted to Mrs. Hubert Hilder, Executive Secretary of the exhibition, for her coöperation in the present project.

exceptions: in the group from France, one drawing by a 13 year old child was included; in that from Russia, one by a 13 and one by a 15 year old, respectively, and in the Balinese, two drawings by 5 year olds. The number of drawings from each country ranged from 2 to 45, in over half of the cases the number being 10 or more. In view of the large number and wide variety of groups represented, it was believed that an analysis of this material would prove fruitful. The appearance of certain clear-cut tendencies in our results, as well as the close agreement of our findings on certain countries with those of previous studies in the same countries, suggested further that such an analysis would not be without value. The material has been summarized in the series of protocols below. The total number of drawings, as well as the age distribution, are given for each country.

PROTOCOLS

1. *AMERICAN INDIAN.* N = 18 Ages: 12 – 2, 11 – 3, 10 – 3, 9 – 3, 8 – 1, 7 – 2, 6 – 4

Subject matter: All except one portray Indians, the single exception depicting bears. Animals are shown in 3 drawings, although exclusively so only in one. All scenes are outdoors. Among the activities portrayed are: 1 agricultural—man and woman hoeing corn; 1 domestic—woman hanging up clothes; 1 athletic—foot race; 2 hunting; and 3 magic—men wearing animal masks, and eagle dancers. One pictures a Pueblo woman and another shows a woman with papoose.

Coloring: Brown paper, the color of the skin of Indians, was used, and this color predominates throughout the drawings. There are no pale tints, but rather brilliant colors are employed.

Technique: Few of the drawings are decorative, one exception showing a geometric design. Certain of the figures are ornate, although extremely realistic. A wide range of detail is shown. Only 4 of the 18 drawings have clearly indicated backgrounds.

2. *BALI.* N = 32 Ages: 12 – 6, 11 – 5, 10 – 4, 9 – 1, 8 – 5, 7 – 7, 6 – 1, 5 – 2 (not reported—1)

Subject matter: All have men, although animals are also numerous. Among the scenes portrayed are water oxen tilling soil, rooster fight, thick jungle with animals, monkeys, birds, dragons, wild pigs, snakes, masked and unmasked devil dancers, and man pouring liquid from bottle into glass. Fourteen drawings show men fighting. The men have enormous grotesque heads and faces, with large red mouths and lips, and protruding teeth. The nose is large and pointed or piqued, and the head is either hairless or else the hair is standing on end. Most of the men are naked, although some wear loin cloths or red trousers. The bodies are frequently painted yellow. All carry knives. There is no attempt at landscape or still life; the drawings show exclusively people or animals in action. Vegetation is tropical when shown.

Coloring: Most are black and white drawings, frequently in outline. When used, the colors include bright reds, yellows, and greens, arranged in a very motley fashion. Even in such cases, however, most of the picture is left unpainted.

Technique: The drawings are crowded and complex, although extremely disorganized. All but 3 are entirely without background. Although an attempt is made at realism, there is a definite lack of detail. In a few cases, an attempt has been made at decorative ornateness as well as symbolism.

3. *BRAZIL.* N = 8 Ages: 12 – 3 9 – 1
11 – 4

Subject matter: Seven drawings have people, the other being a landscape. Three show water. All but one illustrate outdoor scenes, the exception being a school, partly out-of-doors. Among the titles given to the drawings are: "Recreation of School," "The New Quay by the Cajú Beach," "Manufacturing in San Christovão Elvira de Carvalho," "Carnival in the Suburbs," "Commercial Harbour," "Free Market in Town," "The Defense of the Goal" (soccer), and "On the Parabyba River," the last showing a bridge, railroad train, airship, and small canoe. The vegetation is tropical or semi-tropical.

Coloring: Green predominates. The pictures as a whole are fairly bright, the backgrounds being moderately light to medium.

Technique: The drawings as a whole are moderately crowded and unified, although complex. Detail is good, but there is no attempt at ornateness.

4. *BULGARIA.* N = 11 Ages: 10 – 2 8 – 4
9 – 2 7 – 3

Subject matter: Eight drawings have people. Village snow scenes with peasants predominate, and 2 show children on sleds. Three depict fables, one being that of the wolf who fished with his tail until it became

frozen in the ice. One shows a Bulgarian patriot on horseback meeting a Turk wearing fez. All but 2 scenes are outdoors.

Coloring: White predominates, the pictures being fairly bright.

Techniques: The drawings are of medium complexity and moderately well executed.

5. *CANADA.*	N = 41	Ages: 12 – 11	8 – 2
(*ONTARIO, QUEBEC,*		11 – 11	7 – 4
BRITISH COLUMBIA)		10 – 6	6 – 4
		9 – 3	

Subject matter: Nineteen of the drawings do not show people; 9 have animals, of which 4 depict the Noah fable and 2 show "zebras in Africa." There are several landscapes, many with snow. Among the other subjects illustrated are: flowers (2), airplanes (2), cactus in desert (1), recreation (7), and costumes (4)—showing the typical flared skirts and bonnets on the women and tall black hats on the men. Ten show water. A wide variety of subject matter is portrayed.

Coloring: Colors are vivid and show a wide range of hues. Backgrounds are dark as a rule.

Technique: The drawings are crowded and complex, although moderately unified. Detail is poor, and there is a preponderance of large brush strokes.

6. *CHILE.*	N = 5	Ages: 12 – 2	10 – 2
		11 – 1	

Subject matter: Three drawings show people and 2 animals—distorted bird and donkeys. More specifically, the subjects are: store; brown skinned woman's face depicting anger; soldiers, with mountains in background; modified bird; low adobe stone and brick house of typical Chilean architecture. All except the facial expression are outdoor scenes.

Coloring: Brown predominates. The colors are vivid and the backgrounds light.

Technique: In general, the drawings are fairly crowded, unified, and rather complex. There is a moderate amount of detail, without ornateness.

7. *CHINA.*	N = 28	Ages: 11 – 1	9 – 3
		10 – 2	7 – 1
		(not reported – 21)	

Subject matter: All have people and 3 have animals—dogs, cat, lion. All scenes are outdoors except one, a stage. Among the subjects portrayed are: war (9), 2 of which show airplanes and one a camouflaged tank; agriculture (4), 2 of which show rice fields with drainage ditches; religious ceremonial with animal's head; people sewing; stage with three actors; circus with lions; schoolhouse; and girl skipping rope. Four are

water scenes, showing Chinese junk, typical Chinese houses and bridges, etc.

Coloring: Light pastel shades predominate. Backgrounds are bright and usually white or lightly tinted. Skin color varies from yellow to white.

Technique: In general, the drawings are fairly crowded, disorganized, and rather complex. Detail is fair. The drawings are not ornate, but are frequently conventionalized, as exemplified by the portrayal of the sun as a circle or disk with spreading rays, and of bird in flight as a curving V.

8. *COLOMBIA.* N = 9 Ages: 10 – 2 8 – 3
9 – 4

Subject matter: Four have people, and 3 animals—chicks, birds, goose, cow, cat. All are outdoor landscapes, and all but one have houses. One shows 5 airplanes, one a church, and one an automobile. Three have conventionalized suns, 2 of which have faces. The landscapes show rolling fields and gently sloping hills.

Coloring: Gaudy and bright reds, greens, and blues are employed. The principal objects are bright, although the backgrounds are clouded and of varying darkness.

Technique: The drawings are large, moderately crowded, fairly unified, and of medium complexity. They are not ornate. Detail is poor, as is the general technique.

9. *COSTA RICA.* N = 5 Ages: not reported

Subject matter: Two show low, flat, gaudy buildings; 1 vegetation, with bananas; 1 tropical fruits, including bananas and pineapples; and 1 transportation of copper, with man, animal, and cart. Only the last drawing portrayed a person.

Coloring: Colors are fairly vivid and gaudy, but none is predominant. Backgrounds are in white or light tints.

Technique: In general, the drawings are fairly crowded and complex, although unified. Detail is good in only one picture (transportation), as is also the general technique. There is no ornateness.

10. *CUBA.* N = 6 Ages: 11 – 2 10 – 4

Subject matter: No people are shown in any of the drawings. Five depict wild animals—tigers, ape, rhinoceros, and prehistoric animal. Two are water scenes. The sky is usually blue and clouded, and the tropical vegetation is green and luxurious; the houses are of yellowish grey straw with large thatched roofs.

Coloring: Green predominates. The pictures are of medium brightness.

Technique: The drawings are crowded and complex, but unified. Detail is very good, but never ornate. In general, the approach is very realistic.

11. *CZECHO-SLOVAKIA.* N = 9 Ages: 7 – 3 6 – 6

Subject matter: All depict people, animals being also included in two. Decorative stripes predominate, being found in the peasant costumes and even on boat, automobile, and house. Among the subjects represented are 3 landscapes; seascape; soldiers on horseback; children at play; girl with hairribbon; man wearing peaked caps with feathers; and flags and balloons.

Coloring: No color was predominant, brown and blue of moderate intensity being slightly more common.

Technique: All of the drawings were without backgrounds. They may be characterized as simple, isolated, and disorganized, with poor detail.

12. *DENMARK.* N = 4 Ages: 11 – 3 10 – 1

Subject matter: No people are shown in any of the drawings. Three are indoor still life and one a landscape with building. One of the still life drawings was made entirely with a straight edge, and showed an interior with table, step ladder, and circular wall hanging.

Coloring: Very pale colors were employed, light blues and pinks predominating. The background was light.

Technique: The drawings were simple, isolated, and unified. Realistic detail was exceptionally good, often to the point of slavish copy in the style of mechanical drawing. The drawings were never ornate.

13. *ENGLAND.* N = 16 Ages: 11 – 1 8 – 1
10 – 2 7 – 6
9 – 2 6 – 4

Subject matter: All depict people, and 5 also include animals. Among the scenes portrayed are: children at play (6); large crowds of people (5); domestic scenes (2); Red Cross activities; interior hospital scene; racing horse in stable; crew race; ball game; street fruit vendor (stereotyped "pink houses"); tree with white blossoms. Two show rain, and the sky, although not usually shown, is dark or grey when visible. The people are dressed in typical English tweeds and checks.

Coloring: There is a wide variety of color and brightness, from gaudy green to somber brown and grey.

Technique: As a rule, the drawings are crowded, complex, and fairly disorganized. Detail is very poor, and the general technique is quite crude.

14. *FINLAND.* N = 11 Ages: 12 – 4 9 – 2
11 – 3 8 – 1
(not reported – 1)

Subject matter: Nine show people, peasant types wearing costumes and wooden shoes, and 2 show animals, including birds and sheep. All scenes

except one are outdoors. There are 2 street scenes, and one each of the following subjects: appearance of angel in the rain; magic ritual; flight from demon; snow scene with skiers; and planting and tilling soil. Two show conventional sun with spreading rays.

Coloring: Brown predominates somewhat. The pictures are fairly dark, although there is wide variation in background, etc.

Technique: The scenes are fairly crowded and moderately unified and complex. Detail is poor except in one case.

15. *FRANCE.* N = 22 Ages: 13 – 1 10 – 5
12 – 12 9 – 1
11 – 3

Subject matter: Sixteen depict people and 4 animals—horses and cows. All but 2 are outdoors. Among the specific subjects portrayed are: 8 country scenes—one in rain, with horse drawing two-wheeled cart; 2 scenes of French peasants, with basket and knitting, respectively; wedding; flowers; market scene, with large blue umbrella; bookstore; girl in red, white, and blue costume pointing finger at cat; and airplanes, 16 planes in different colors going in all directions.

Coloring: A wide variety of brilliant colors is shown, especially reds and blues. Several pictures have no background indicated; when shown, the background is usually light.

Technique: The drawings are fairly crowded, complex, and unified. About one-half show good detail, and some are quite ornate and decorative.

16. *GERMANY.* N = 33 Ages: 12 – 25 10 – 1
11 – 3 7 – 4

Subject matter: People are depicted in all but 8 drawings, and 2 of these 8 show deities. Ten have animals. There are 2 domestic scenes, one indoors and one outdoors, and one drawing depicts war. The majority are ornate mythical and symbolical pictures. Fairy queens are shown in 4, while 3 show men killing a dragon, and 1 shows a witch, blackbirds, and cat. Nine charcoals tend toward modernistic design, and there is one Cubistic geometric design.

Coloring: Vivid colors are used in the pictures. Nine are charcoals. The pictures are bright, as a rule, with white or very light backgrounds.

Technique: The drawings are generally crowded, although fairly unified. They tend to be complex and detailed. Several are highly ornate and decorative. The majority have no background.

17. *GREECE.* N = 8 Ages: 12 – 1 10 – 3
11 – 1 9 – 3

Subject matter: Six have people, and 3 of these show horses with riders. Six have castles, and all are outdoors, showing mountainous landscapes.

One shows war, the soldiers carrying scimitars and large pistols. In all drawings, the people are dressed in peasant costume and wear Greek slippers with curving pointed toe and large tassel. Two drawings portray conventionalized setting sun, with smiling face and spreading rays.

Coloring: All colors are light pastels. Backgrounds are light and very bright. Skin color is either left white or colored a light tan.

Technique: The drawings are isolated and unified. Some are simple and some moderately complex. Detail is fair. On the whole, they are not ornate, but rather realistic.

18. *GUATEMALA.* N = 2 Ages: both by one 12 year old

Subject matter: Both depict peaceful landscapes in the traditional "calendar" style. One shows a church, the other a house. Vegetation is profuse.

Coloring: Green predominates.

Technique: Moderately complex and organized. No attempt at ornateness.

19. *HAWAII.* N = 8 Ages: 12 – 1 10 – 2
11 – 5

Subject matter: People are shown in 4. Three have water, and 3 show American flags. Among the specific subjects portrayed are: tropical fish under water, horned animal, battleship (note recent visit of U. S. fleet), railroad scene, patriotic demonstration, and Synchromistic color picture.

Coloring: Green and blue predominate, little red being used. The colors are bright. Backgrounds are light blue or yellow. Skin color of all people portrayed is reddish brown.

Technique: The drawings tend to be crowded. Some are unified, others disorganized. There is no ornateness or minute detail, large brush strokes predominating.

20. *HUNGARY.* N = 18 Ages: 12 – 8 10 – 2
Ages: 11 – 4 6 – 4

Subject matter: All but 4 drawings have people, and 7 have animals—birds, horses, etc. There are 12 peasant scenes, the peasants wearing ornate, gaudy, decorous, and multi-colored costumes, with ribbons in their long braided hair and sashes around their waists. The peasants are depicted as standing, walking, or extending greeting. Four pictures are crude animal drawings, 1 a landscape with houses, and 1 a purely decorative flower picture.

Coloring: The colors are varied and gaudy and of vivid hues. Backgrounds are white, some including clouds. The red cheeks of the peasants are pronounced.

Technique: The drawings are moderately crowded, complex, and disorganized. Detail occurs on costumes only and the general execution is very crude.

21. *IRELAND.* N = 16 Ages: all by one 10 year old boy

Subject matter: The 16 pictures include both cut-outs and paintings. All have people and none shows animals. One series of 3 pictures represents royal personages, and another religious series of 4 depicts St. Patrick and the traditional 3 leaf clover. Others portray a hanging scene; a castle with man hanging; castle with human heads; and tent or crude hut. All persons wear ornate period costumes, and many are smoking pipes.

Coloring: Pastel shades of moderate brightness are usually employed. Backgrounds are white or yellowish.

Technique: The compositions are unified, complex, and moderately crowded. There is considerable detail, and some ornateness.

22. *ITALY.* N = 10 Ages: 12 – 2, 11 – 2, 10 – 2, 9 – 2, 8 – 1, 7 – 1

Subject matter: Nine portray people, the other showing an airplane. Three have animals—2 with horses and 1 with dog and cows. Other specific subjects are: picking grapes; pruning trees; circus (2); "Francesco Pinedo in Airplane;" "The Latest Victory of the Italian Airplanes;" farm hands eating lunch; outdoor religious gathering; canal scene; merry-go-round; room interior.

Coloring: Light pastel greens, greys, and browns predominate, although a wide variety of colors is used. Backgrounds are white or very pale.

Technique: The compositions are moderately complex, although well organized and not crowded. Detail is very good, but without ornateness.

23. *JAMAICA.* N = 3 Ages: 11 – 1, 10 – 1, 9 – 1

Subject matter: All are outdoor landscapes and all have trees: banana, cocoanut, and pineapple, respectively. The ground is bare. One scene includes a negro.

Coloring: Pastel greens and browns predominate. The sky is pink or slightly blue. In general, the scenes are bright, as in diffuse sunlight.

Technique: The drawings are isolated, unified, and moderately complex. Detail is very good, as is general technique. There is no attempt at ornateness.

24. *JAPAN.* N = 12 Ages: 12 – 1, 11 – 3, 10 – 2, 9 – 4, 8 – 2

Subject matter: Eight of the drawings have people; one shows animals. Five are indoors, and 7 outdoors. There are 5 house scenes, 2 of which show fish waving from poles near the house; a circus with lions, tigers, etc.; wharf and boats in sea or canal; tug-of-war game; fruit vendor; shop; store; and indoor domestic scene.

Coloring: Red and blue predominate. All colors are moderately dark, and backgrounds are dark grey or blue. The skin color of the people varies from blue to yellow.

Technique: The drawings are crowded, complex, and fairly well organized. They are not ornate, and are without detail. The ship scene is an example of excellent work in large brush strokes.

25. *LIBERIA.* N = 17 Ages: not reported

The Liberian drawings were made by students in the Pioneer Community School, Monrovia, Liberia.

Subject matter: Eleven drawings have people; 6 have animals; and 2 show devils' heads. The following titles appeared on the drawings: "Bassa Devil Head," "Vai Devil Head," "Women Paddling," "Woman Washing at the River," "Picking Cocoanuts," "The Elephant," "Old Man Pounding Cassava," "The Cow," "The Leopard," "Gathering Fruits" (snake in tree), "Cocoanut Trees," "The Nice Farm," "Fishermen," "The Native's Hut," "Traveling to the Farm," "Traveling Home," and "Cutting Rice." The last named drawing showed the roots of the rice projecting below the surface of the ground.

Coloring: Brown is the predominant color. The drawings were made on colored papers (green, red, pink, rose, yellow, grey), and no further backgrounds were added. The skin color is black where shown.

Technique: The drawings are simple and rather isolated. There is little detail and no ornate decoration.

26. *LITHUANIA.* N = 9 Ages: 12 – 5 10 – 2
11 – 1 9 – 1

Subject matter: People are portrayed in 8 of the drawings, whereas animals are shown in 3. All are outdoor views. There are 2 water scenes with boats; a market place; religious scene; fire department putting out fire; shepherd; and the remainder are landscapes.

Coloring: Green is most widely used. Backgrounds are usually a bright blue, and the general tone is fairly bright.

Technique: The drawings in general are crowded, fairly complex, and disorganized. Detail is good only in one case, and there is no evidence of ornateness.

27. *MEXICO.* N = 42 Ages: 12 – 6 8 – 4
11 – 10 7 – 2
10 – 11 6 – 1
9 – 8

Subject matter: People are represented in all but 4 of the drawings. Animals, such as the donkey, cow, and dog, are shown in 10 cases, and are relatively small in size. There are 10 indoor scenes and 26 outdoor landscapes. Seven scenes are religious in nature, showing churches, etc.; 5 are recreational, such as ball game, skipping rope, theatre, circus, girl playing dolls; and 8 are agricultural and industrial—hauling corn, milking cow, painting house, constructing building, building street, transporting stone, fighting fire, and laborers shaking hands. Vegetation consists of cactus and small, scrubby trees, which are dwarfed much as were the animals mentioned above.

Coloring: Vivid and brilliant colors are used, red, green, and blue predominating. Backgrounds are always dark and colored, whether indoor or outdoor scenes are portrayed. Skin color ranges from reddish tan to brown in every case.

Technique: The drawings are crowded, although unified, and complex. Thus, for example, there are over 50 people in a church scene, over 40 in a circus scene, and 18 in a street scene. The approach is never decorative or ornate, but realistic and often rather harsh. Four of the drawings are exceptionally well designed and executed, evidently by children with special training, the dark, round faces and other features strikingly resembling the contemporary work of Rivera, Orozco, and Siqueiros.

28. *NEW ZEALAND.* N = 9 Ages: 7 – 3 6 – 6

Subject matter: Five drawings show people, although they occupy a minor position in such pictures. One drawing shows a strange animal. All scenes are outdoor landscapes. Four pictures include fences, nicely shadowed on one side, and one shows a rainbow.

Coloring: All colors are used, although blue seems to be slightly preferred. They are saturated, but not bright.

Technique: The scenes are simple, unified, and not crowded. They lack both detail and ornateness.

29. *NICARAGUA.* N = 2 Ages: 12 – 1 11 – 1

Subject matter: One of the drawings portrays an outdoor serenade by a boy on a rugged balcony to a girl seated on a lower level, holding a flower. There are 3 birds and a swan on the lake, a yellow moon, and very romantic atmosphere. The other (indoor) picture shows a woman rocking a baby with rattle, a man looking on.

Coloring: The first picture is in dainty but bright pastels, and the second is in charcoal.

Technique: The drawings are crowded, complex, and detailed, although rather well organized.

30. *PALESTINE* N = 20 Ages: 11 – 4 8 – 3
10 – 3 7 – 2
9 – 5 6 – 1
(not reported—2)

Subject matter: Seventeen drawings have people, although most of the characters are small and distant, and difficult to identify; 9 have animals —camels, horses, cows, and sheep. All scenes are outdoor and all include large areas and portray vast expanses of hills, 5 being bird's-eye views. Six drawings depict religious scenes, such as winged gods and angels (2), parade of torch bearers, and Elijah praying before the burning bush (Biblical). The vegetation is typical, consisting mostly of palms. Narrow roads, resembling ribbons, wind over gentle slopes and hills of sand.

Coloring: There is a marked predominance of reddish yellows, portraying the desert sands. Backgrounds above the horizon are mostly bluish.

Technique: The drawings are never crowded, but represent wide open spaces. Although the scenes are often complex, there is little attempt at unification. Detail is fairly poor.

31. *POLAND.* N = 9 Ages: 12 – 3 10 – 3
11 – 2 9 – 1

Subject matter: All 9 drawings show people, and none shows animals. All are outdoor scenes portraying marketing (2); planting crops; street or market scene; workman repairing wires; fairy story (Hansel and Gretel); and decorative figures and geometric designs. Thus most portray every-day activities.

Coloring: All colors are used, none being predominant. The colors are bright, and the backgrounds are light in all but 2 cases. Skin color is white and yellowish white.

Technique: The paintings are moderately crowded and disorganized, and fairly complex. The market scene alone is detailed in execution. One of the 9 drawings is ornate, the rest being moderately so.

32. *SCOTLAND.* N = 2 Ages: 11 – 1 8 – 1

Subject matter: Each of the drawings portrays both people and animals. Both drawings are religious: "The Pilgrim" and "Saint Jerome in the Wilderness," the latter depicting the parable of the mutual love of man and animals. In both pictures the country is very hilly.

Coloring: The colors are dark, but saturated. Backgrounds are dark.

Technique: The drawings are very crowded and complex, although well organized. Detail is fairly good.

33. *SOUTH AFRICA.* N = 8 Ages: 11 – 2 8 – 1
9 – 4 7 – 1

Subject matter: Five show people. Seven are outdoors, and 6 of these are landscapes. There are 3 more or less schematic drawings of men and

children, and 2 show children playing. One portrays a king, and another a pile-dwelling with sea in the distance. The trees are tropical.

Coloring: There is no predominant color. In general, the colors are light, all but 2 being pastels. Skin color is white in one case, black in another, and not visible in the remainder.

Technique: The drawings are of medium complexity, well unified, and without ornateness.

34. *SPAIN.* N = 22 Ages: 12 – 7 10 – 8
11 – 7

Subject matter: All contain people, and 3 have animals—bull, cat, and dog. Five scenes are indoors. Twelve represent elections, 5 of which show men depositing ballots in glass bowls; one is entitled "Las Elecciones del Domingo 3 de decembre," and several show socialists and communists participating. Three portray peasants, one showing them selling oranges. In addition there are caricatures of famous Spaniards, street scenes—3 with armed guards—a bull fight, and sitting matador.

Coloring: A wide variety of colors and brightnesses is used. Backgrounds are light and usually white. Skin color is dark, usually tan.

Technique: The drawings are complex, fairly crowded,and disorganized. Detail is not very good.

35. *SWEDEN.* N = 22 Ages: 12 – 3 10 – 9
11 – 10

Subject matter: People are portrayed in 20, and animals (mostly horses and a few sheep) in 11. All are outdoor scenes. Ten are mythical or religious, including: kings with crowns; 2 with very large gods; 2 with chariots drawn through the air by horses; and one with Norse ships. The sea is depicted in 4 drawings, one showing a sinking ship in a storm. There is a general predominance of winter scenes.

Coloring: Blue, grey, and white predominate. Backgrounds are light. As a whole, the pictures are very bright. Skin color is light yellow in a few cases, but usually white.

Technique: All but 3 are simple and isolated. The drawings are loosely organized, not ornate, and show little detail.

36. *SWITZERLAND.* N = 19 Ages: 12 – 18 11 – 1

Subject matter: All but one show people. Four have animals, one being an animal angel. Six depict the supernatural, labeled: "The Three Sages," "Fairy Wedding," "Dance Around the Golden Calf," "Door of the Sky," "Mr. Autumn," and " Spring's Approach," Other subjects portrayed include: children at play (3); typical Swiss walled cities (2); merry-go-rounds (2); apple-picking; mountain climber; masked man; steeplechase; and complicated flower.

Coloring: Yellow and red predominate. The colors are always light and sunny. All backgrounds are white except in one night scene.

Technique: The drawings are complex, crowded, and fairly well-organized. Detail is very good in most cases and some of the drawings are ornate.

37. *TUNISIA.* N = 17 Ages: 10 – 8 7 – 2
8 – 7

Subject matter: People are depicted in only 7 drawings, and animals—birds, ostrich, rooster, horse, lion, and lioness—in 8. Eight pictures show small red flowers with green leaves, the branches being used as decoration and background. There are 2 landscapes, one castle, and one large flower picture.

Coloring: The hues are vivid, a mustard color being predominant, although red, yellow, and green are also extensively used. Backgrounds are white.

Technique: The drawings are extremely crude, and it is often very difficult to recognize the people. The works are simple, fairly isolated, and disorganized. There is practically no detail.

38. *TURKEY.* N = 10 Ages: 12 – 1 10 – 1
11 – 1 8 – 3
(not reported – 4)

Subject matter: Five drawings show people and 4 have animals, including a crane. All are outdoor scenes. There are 4 country and 2 waterfront landscapes, and 4 show children at play. Among the objects portrayed are birds' nest built in chimney, Turkish flag with star and crescent, and conventionalized sun with spreading rays.

Coloring: Green is the predominant color, and pastel shades are most often employed. The colors are usually bright, and backgrounds are white or light blue.

Technique: The drawings are complex, very crowded, disorganized, and not ornate. Detail is poor, as is the general technique.

39. *UNION OF SOCIALIST SOVIET REPUBLICS.* N = 45 Ages: 15 – 1 10 – 7
13 – 1 9 – 8
12 – 17 8 – 2
11 – 8
(not reported – 1)

Subject matter: All but 7 have people and 4 have animals—pig, reindeer, and horse. Sixteen portray machines, including tractor (3), trucks, automobile, railroad, airplane, tank, and laboratory balance. Many are snow, agricultural, industrial, and political scenes, the latter groups often resembling posters. Specific subjects pictured include: ships at sea (3);

snow man; man fishing; communistic speech; "Lenin in Petrograd"; "At a Pioneer Camp" (communistic drill); "Preparation for November Celebration" (making posters); "The Factory"; "The Garage of Moscow Tractor Station"; "Workers' Settlement"; and "A Socialist City."

Coloring: The colors are vivid and somewhat dark, red, blue, green, brown, and black being used profusely with startling effects. Backgrounds vary, but are usually dark.

Technique: The drawings are complex, crowded, and usually unified. Detail is good in many. The drawings cover a wide range of technique.

40. *VENEZUELA.* N = 3 Ages: 12 – 2 11 – 1

Subject matter: One shows an open landscape with 3 men and a woman and a group of chickens and donkeys. The other 2 portray tropical palm and cocoanut trees, respectively, the roots of the latter trees being visible below ground level.

Coloring: Green is predominant, and the backgrounds are white or lightly tinted.

Technique: The drawings are simple, isolated, and fairly unified. Detail is exceptionally good. The drawings are realistic and not ornate. General technique and composition are excellent.

41. *YUGO-SLAVIA.* N = 11 Ages: 11 – 2 9 – 2
10 – 7

Subject matter: All portray people, and 7 also include domestic animals. All but 2 are outdoors. There are 6 scenes of farm-work; 2 urban street scenes, one with autmobile; and military, domestic, and farm festival scenes. Among the other items represented are 2 wells, windmill, yoke water carrier, and fisherman. Nearly all men have mustaches.

Coloring: Fairly bright pastels are used throughout, with backgrounds of light blue or white.

Technique: The drawings are moderately complex and crowded, though fairly well organized. Detail is good in only 2 pictures.

Careful study of the foregoing material will at once reveal certain inadequacies in the original data, such as small number of cases, lack of knowledge concerning many of the conditions under which the drawings were made, etc. To these intrinsic limitations must be added the defects inherent in the protocol technique, since any attempt to couch specific observations in verbal terms will inevitably falsify to a certain extent as well as leave much unsaid. Notwithstanding these unavoidable limitations, however, the number and variety of cultures rep-

resented, as well as the large and often striking intercultural differences in the drawings themselves, made it seem desirable to enumerate briefly a few of the more significant trends in the data. These major trends, indicating a general correspondence between the various aspects or details of the drawing and the concrete cultural or stimulus conditions under which it was produced, can be but briefly stated and illustrated; and the reader is asked to refer to the original protocols both for an elaboration of the specific examples cited and for other equally relevant examples which space does not permit us to include.

The widest variety of GEOGRAPHICAL, CLIMATIC, and LOCATIONAL characteristics are depicted in the different drawings, and such characteristics in many cases correspond to a remarkable degree to actual conditions in the various countries. Thus only outdoor scenes are drawn by the American Indian, Brazil, Chile, Colombia, Greece, Jamaica, New Zealand, Palestine, Sweden, and Turkey groups, whereas interior scenes are relatively more common in Denmark, Japan, and Mexico. More specifically, the geographical characteristics of the drawings range all the way from the snow-covered landscapes of Canada, Russia, and Sweden, through the mountainous country of Chile and Greece, the rough hills of Scotland, the gently sloping fields of Colombia, the water scenes of Cuba and Hawaii, the bare brown ground of Jamaica, and the cactus-covered lands of Mexico, to the vast expanses of reddish sands in Palestine. Likewise, some of the drawings, such as those from Greece, Hawaii, and Jamaica, are very bright and sunny, whereas those from London, England, in particular are dull and dreary, with dark gray sky when visible, and rain specifically portrayed in two of the 16 drawings.

Correlated with the differences in geographical, climatic, and locational characteristics mentioned above, are found corresponding differences in VEGETATION. Perhaps the most outstanding example of this fact is the tropical and semi-tropical vegetation depicted in the drawings from Bali, Brazil, Costa Rica, Cuba, Guatemala, Jamaica, Liberia, South Africa,

and Venezuela. From New Zealand, we find drawings of fertile green fields or pastures, occasionally broken by enclosing fences. Rice fields are shown in certain of the drawings from China and Liberia, and the only specific verdure pictured in the English drawings is a tree with white blossoms. In Tunisia, approximately half of the drawings show small red flowers with green leaves. In most of the countries, however, no particular attempt was made to portray specific types or varieties of vegetation, indicating the relatively minor part which vegetation plays in the life of such peoples. The children from tropical and semi-tropical countries, on the other hand, featured fruit trees and dense forests in their drawings. In Costa Rica, banana and pineapple trees are pictured; in Jamaica, banana, cocoanut, and pineapple trees; in Liberia, cocoanut and other tropical fruit, as well as rice and cassava; and in Venezuela, the cocoanut tree and tropical palm are portrayed. In Mexico, cactus and small scrubby trees are drawn, whereas in Palestine we see only palm trees and vast expanses of sand.

The problem concerning the characteristics of the PEOPLE drawn by the various groups may be attacked along at least three major lines. The *first* of these questions concerns the relative number of drawings within a given group which show one or more persons. It will be recalled that, according to the traditional literature (*cf.* above), the drawings of young children are said usually to contain and center about human beings. That there is wide variability in this fact and that all of the countries do not show this phenomenon will immediately appear upon inspection of the protocols. Thus it will be seen that whereas in the groups of American Indians, Bali, China, Czecho-Slovakia, England, Ireland, Italy, Mexico, Poland, Switzerland, U. S. S..R., and Yugo-Slavia, people are universally or almost universally portrayed, they are more rarely seen in the drawings from Canada, Colombia, Costa Rica, Hawaii, Jamaica, Japan, Liberia, New Zealand, Tunisia, and Turkey, and universally absent in the case of Cuba, Denmark,

and Guatemala. Nor can such differences in the percentage of drawings portraying people be attributed to consistent age differences among the various countries. The *second* question concerns the number of people depicted within a single drawing. Some of the drawings, such as those from Costa Rica and Jamaica for example, depict a single person; and but few people are shown in individual drawings from most of the countries. A few groups, however, notably England and Mexico, usually show large numbers of people within a given scene, whether this be a church, street, circus, recreational, or indoor domestic scene. It is interesting to note that at least in the case of England the present results confirm those of Ballard (2) who states that English children, especially at the younger ages, show a strong tendency to include human beings in their drawings irrespective of the subject portrayed. The *third* question regarding people deals with the relative prominence of such human beings as are pictured. Here again there are wide inter-cultural differences. In Bali, for example, the figures are central, as they are in the case of England. In Jamaica, New Zealand, and Palestine, however, the persons drawn occupy a very subordinate position, the figures being so small and distant in the last named country as to be hardly discernible.

The OCCUPATION or ACTIVITY of the people depicted by the various groups also merits detailed consideration. *Recreational* activities when portrayed show a marked correspondence to the cultures of the different groups, as is exemplified in the American Indian foot race, Brazilian carnival and soccer game, Bulgarian children on sleds, Chinese stage with actors, skiing in Finland, tug-of-war game in Japan, matador and bull fight in Spain, and farm festival scene in Yugo-Slavia. The *religious* scenes also correspond very closely to the various cultures, as illustrated by the eagle dancers of the American Indian, the masked and unmasked devil dancers of Bali, the many Irish church and saint drawings, the Italian outdoor religious gathering, and the traditional religious drawings

from Lithuania, Mexico, Palestine, Scotland, and Spain. There are no religious drawings from Poland or Russia. The *agricultural* and *industrial* occupations likewise show marked inter-cultural variation in both frequency and pattern of activity. Among the various occupations portrayed are: hoeing corn (American Indian); tilling soil with oxen (Bali); working in the rice fields (China); planting and tilling soil (Finland); picking grapes, pruning trees (Italy); selling fruit (Japan); washing at river, pounding cassava, gathering fruits, fishing, cutting rice (Liberia); selling goods, tending sheep (Lithuania); hauling corn, milking cow, painting house, constructing buildings, streets, etc. (Mexico); marketing, planting crops, repairing wires (Poland); fishing, large scale manufacturing (U. S. S. R.). These results clearly indicate a portrayal of subjects closely connected with the everyday life of the various cultures, and are corroborated by many studies in the literature, a typical example being that of Maitland (19) who found the occupations of hunting, fishing, and drying fish portrayed by Eskimo children under 14. *Political* activities are especially predominant in the drawings from Spain and Russia. *War* or *fighting* is illustrated in certain of the drawings from Bali, China, Greece, Italy, Spain, and Yugo-Slavia, the particular scenes, however, differing in characteristic fashion from country to country, as in the case of the other varieties of human behavior depicted.

The ANIMALS drawn also bear a definite relationship to the particular countries. As in the other material, there is a close correspondence between the number and species of animals drawn and the presence of such animal forms in the individual cultures. Bali, with drawings of monkeys, birds, wild pigs, rooster fights, and "dragons;" Cuba, with five of the six drawings showing tigers, apes, rhinoceros, and unknown animal; Liberia, with eight pictures showing elephant, leopard, cow, and snake; and Tunisia, with drawings of lion, lioness, horse, ostrich, rooster, and other birds, showed the largest number of animal drawings. No animals were portrayed in any

drawings from Brazil or Ireland. In sharp contrast to the tropical animals listed above is the reindeer drawn along with the pig and horse by the children of U. S. S. R. Bears occurred in the American Indian drawings; the donkey was peculiar to Chile and Mexico; the camel to Palestine; the crane to Turkey; and the bull to Spain. Sheep are shown in several pastoral countries, such as Finland, Palestine, and Sweden. Tropical fish are shown in Hawaii. The horse is found in more drawings, as well as in drawings from more different countries, than any other single animal, although cats and dogs are also fairly common. The animals drawn by the Mexican children, donkey, cow, and dog, are all relatively small in size. The present results are in general confirmed by many of the studies reported in the literature (*cf.* above). Thus Ballard (3) found that Welsh rural children frequently drew animals, whereas London children of the same ages did not. Likewise, Maitland (19) reported that Eskimo children drew animals, such as fish, walrus, whale, reindeer, and birds, and that this subject was over three times as numerous as in the drawings of California school children. McDermott (21) reported horses to be most frequently drawn by Indian boys; Dégallier (5) found fish, birds, and cats most often drawn by Pahouin girls of French Congo; reindeer and elk were most often drawn by the Orotchen children of Siberia studied by Schubert (27).

Special mention might also be made of certain of the many ACCESSORY OBJECTS portrayed in the drawings. The *dwellings,* for example, range all the way from the native's hut in Liberia; South African pole dwelling; straw house with thatched roof in Cuba; Chinese house of oriental architecture; the low, flat, gaudy buildings of Costa Rica and low adobe store and brick house of Chile; the gaudily striped Czecho-Slovakian and Hungarian peasants' homes; the stereotyped "pink" houses of England; the tent, crude hut, and castles from Ireland; the castles from Tunisia and Greece; to the elaborate walled towns of Switzerland. In confirmation of certain of the present findings, reference is made to the pole dwellings

drawn by Papuan boys reported by Haddon (11) and to the Swiss walled city reported by Tomlinson (28, p. 94) from the Pestalozzianum Collection in Zürich. In the light of the wide variety of dwellings drawn, it is interesting to note the statement of Katzaroff (12) to the effect that children's drawings of houses are remarkably uniform, being more a symbol than a portrayal of specific dwellings. *Churches* are shown in the drawings of Colombia, Lithuania, and Mexico; *factories* in Brazil and garage, workers' settlement, etc., in U. S. S. R.

Various types of *conveyances* are also pictured. Water types are represented by small canoe (Brazil), junk (China), crew shell (England), battleship (Hawaii), canoe with paddle (Liberia), Norse ships (Sweden), as well as more orthodox ships in the drawings from Czecho-Slovakia, Japan, Lithuania, Sweden, and U. S. S. R. Riding horses are drawn in Bulgaria, Czecho-Slovakia, Greece, and Mexico. Children's sleds are pictured in Bulgaria; skis in Finland; racing horse in England; and small animal carts in Costa Rica and France. Fire engines occur in drawings from Lithuania and Mexico; Red Cross ambulance from England; other automobiles from Colombia, Czecho-Slovakia, U. S. S. R., and Yugo-Slavia; railroad trains from Brazil, Hawaii, and U. S. S. R.; tanks from China and U. S. S. R.; and airplanes from Brazil, Canada, Colombia, France, Italy, and U. S. S. R. The reader is also referred in this connection to the findings of Ballard (3) concerning the greater number of vehicles in the drawings of city as compared with country children and the prevalence of ships in drawings from seaside localities (*cf.* above).

The *weapons* drawn include bow and arrow (American Indian), knives (Bali), scimitar and large pistols (Greece), and swords (Spain). *Agricultural accessories* are illustrated by hoe (American Indian and Mexico), crude plough (Bali), drainage ditches (China), tools for pounding cassava (Liberia), and wells, windmill, and yoke water carrier (Yugo-Slavia). Mention may also be made of certain *industrial* and *technological* objects, such as electric wires (Poland), labora-

tory balance (U. S. S. R.), and many of the mechanical conveyances discussed above. *Recreational* and related facilities are represented by stage for actors and skipping rope (China), flags and balloons (Czecho-Slovakia), ball game paraphernalia (England, Mexico), American flags (Hawaii), tobacco pipes (Ireland), merry-go-round (Italy and Switzerland), circus (Japan, Mexico), skipping rope and dolls (Mexico), musical instrument, rocking chair, and baby's rattle (Nicaragua), matador equipment (Spain), and steeplechase accoutrements (Switzerland). Examples of *religious* and related institutional objects include animal's head (China), three-leaf clover (Ireland), fish waving from poles (Japan), devils' heads (Liberia), and king's crown and chariots (Sweden). *Clothing* forms another category of accessory objects which varied in the drawings from country to country. The feathers and papoose holder of the American Indian, the loin clothes and red trousers of Bali, the tweeds and checks of England, the traditional costume of the Spanish matador, and the colorful and distinct peasant dress of Bulgaria, Canada, Czecho-Slovakia, France, Greece, Hungary, Spain, and Yugo-Slavia deserve mention in this connection, and certain of the characteristics of attire in these various groups will be considered below in the discussion of DETAIL and DECORATION.

The IMAGINATIVE CHARACTER of certain of the drawings also merits special consideration. Most of the drawings were unimaginative in the sense that the attempt was made to portray objects and activities of everyday life. In a few cases, however, both the subject portrayed and the general technique utilized gave evidence of certain imaginative qualities. This is illustrated by *religious* subjects such as Noah stories (Canada); St. Patrick series (Ireland); angel in the rain, magic ritual, and flight from demons (Finland); deities (Germany); winged gods and angels, parade of torch bearers, and Elijah praying before the burning bush (Palestine); "The Pilgrim" and "St. Jerome in the Wilderness" (Scotland); large gods (Sweden); and animal angel (Switzerland). *Fables*

and *mythology* furnish numerous examples, as shown by the drawing of the wolf fishing with his tail (Bulgaria); fairy queens, men killing dragon, and witch with cat and blackbird (Germany); royal personages, castle with human heads (Ireland); Hansel and Gretel (Poland); kings, chariots in the air, and Norse ships (Sweden); and "The Three Sages," "Fairy Wedding," "Dance Around Golden Calf," "Door of the Sky," "Mr. Autumn," and "Spring's Approach" (Switzerland). Imaginative subjects of an entirely different nature include a Cubistic drawing from Germany, Hawaiian Synchromistic painting, Polish decorative figures and geometric designs, and lastly, the caricatures of famous Spaniards from that country. The predominance of fairy tales and mythology in the drawings from Sweden and Switzerland was particularly striking, and these findings are corroborated by Eng (6, pp. 93–95) for Sweden and by Tomlinson (28, pp. 55–91) for both countries. Thus it would seem that "imaginativeness" may show marked inter-cultural variation and cannot therefore be regarded as a characteristic of any given stage or developmental level.

The wide range of COLOR employed in the different drawings was especially noticeable, and there were evidences of distinct inter-group differences in its use. The brilliant, saturated, and frequently gaudy colors used in the drawings of American Indians, Bali, Chile, Colombia, Costa Rica, Czecho-Slovakia, France, Germany, Hawaii, Hungary, Lithuania, Mexico, and Tunisia, were in sharp contrast to the light pastels from China, Denmark, Greece, Ireland, Italy, Jamaica, Turkey, and Yugo-Slavia, and the darker colors in certain of the drawings from England, Japan, Scotland, and U. S. S. R. As would be expected, green predominated in the drawings from Brazil, Cuba, Guatemala, Lithuania, and Venezuela; green and blue in Hawaii; green and brown in Jamaica; brown alone in Chile, Liberia, and Palestine; and a mustard color in Tunisia. The specific use of color, such as is illustrated by the striped costumes of the various peasant groups (*cf.* above), the yellowish

bodies of the Bali natives, the gray or dark English sky, the red cheeks of Hungarian peasants, and the reddish yellow desert sands of Palestine, needs no further elaboration. In most of the countries, no special attempt was made to portray *skin color*. The colors which were used, however, included the following: usually white, but yellow in a few cases (Sweden); white and yellowish white (Poland); yellow to white (China); yellow to blue (Japan); white or light tan (Greece); reddish (Cuba); dark, usually tan (Spain); reddish tan to brown (Mexico); white or black (South Africa); and black where shown (Jamaica and Liberia).

Little need be said concerning differences in GENERAL TECHNIQUE. Many of the drawings from the American Indians, France, Germany, Ireland, and particularly Switzerland are rather ornate; and certain of the drawings from France and Germany are highly decorative. There is a preponderance of large brush strokes in several of the drawings from Canada, Hawaii, and Japan. In general, the drawings from Bali, Canada, England, Germany, Japan, Lithuania, Mexico, Nicaragua, Poland, Scotland, Spain, Switzerland, Turkey, U. S. S. R., and Yugo-Slavia tend to be complex and crowded, whereas simplicity is more characteristic of those from Liberia, Sweden, Tunisia, and Venezuela. In striking contrast to the crowded drawings just mentioned are those from Palestine, which feature bird's-eye views of large areas of land. Backgrounds are usually present in one way or another, although this is not the case in most or all of the drawings from the American Indians, Bali, and Czecho-Slovakia. As a whole, the drawings from New Zealand, Nicaragua, Switzerland, U. S. S. R., Venezuela, and Yugo-Slavia tend to be rather well organized and unified, whereas most of those from Bali, Czecho-Slovakia, Lithuania, Spain, Sweden, Tunisia, and Turkey are relatively disorganized. Examples of what has been termed "conventionalized symbols" are to be found in the depiction of the sun as a circle or disk with spreading rays in certain of the drawings from China, Finland,

Greece, and Turkey, and in the use of the curving V to represent birds in flight in the Chinese drawings. "Intellectual realism," or the tendency of the child to draw an object as he knows it to be rather than as he sees it, was noted in only two of the 602 drawings: in a Liberian drawing, "Cutting Rice," the roots of the rice were shown projecting below the earth; and similarly, a drawing of a cocoanut tree from Venezuela shows the roots visible below the ground level. Lastly, from the standpoint of general execution, the drawings from Jamaica, Mexico, and Venezuela appear to be among the best, whereas those from Colombia, England, Tunisia, and Turkey show relatively inferior technique and composition.

The drawings from the various countries also differed widely in the amount and kind of DETAIL. Many examples of this fact have been pointed out in the discussion of all of the previous topics. In every case the particular type and variety of objects portrayed, as well as the specific degree of detail assigned to each of such objects, have varied from country to country, corresponding in each case with the degree to which that object was found or behaviorally emphasized in the particular culture. As a whole, the drawings from Bali, Czecho-Slovakia, Spain, Tunisia, Turkey, and Yugo-Slavia are rather poor in detail, as contrasted with the generally more detailed and realistic execution from the American Indians, Cuba, Denmark, Greece, Ireland, Italy, Jamaica, Mexico, Switzerland, and U. S. S. R. The *specificity of detail*, however, cannot be overestimated. Not only do most of the countries show great variation in amount of detail from drawing to drawing, but in many cases certain objects are pictured in great detail while others in the same drawing are ignored or but sketchily drawn. Striking examples of this tendency toward specificity of detail are found in the feathers and animal masks in the American Indian drawings, the enormous grotesque heads and detailed features in the drawings from Bali, the elaborate, minutely portrayed peasant gowns but otherwise crude drawings from Hungary, and the detail occurring exclusively in the landscape

minutiae of the Palestine drawings. These results concerning specificity of detail are corroborated by many studies reported in the literature. The drawings from Hungary and Czecho-Slovakia presented by Tomlinson (28) show detailed and ornate peasant costumes. Probst (25) has described certain special characteristics of the drawings of Kabyle children which are directly traceable to idiosyncrasies of the local Mohammedan customs and environment. Schubert (27) found that the drawings of Orotchen children showed greater detail in the portrayal of animal than human subjects, and this was especially true in the case of reindeer, with which the tribe is behaviorally familiar and economically concerned. Thus it would seem that the extent of detail shown by the child not only exhibits wide inter-cultural differences, but shows definite specificity within a single drawing, and hence cannot be used to characterize the child's drawing behavior as a whole.

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SEX DIFFERENCES IN CONVERSATION*

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INTRODUCTION

A NUMBER of investigators have approached the problem of sex differences in interests through the study of topics of conversation. The assumption underlying this approach is that an individual's conversation reflects, to a large degree, the things in which he is most interested.

Moore (1), Landis and Burtt (2), Landis (3), and Sleeper (4) have each found marked sex differences in topics of conversation. In general, they agree that men talk predominantly about business and money, and amusements and sports, while the most frequent topics of women's conversation are personalities and clothes.

Stoke and West (5), however, have reported results which tend to minimize greatly the differences between the conversational topics of the sexes. While men were found to converse most about "things" and sports, and women about personalities, cultural topics, and social conventions, the differences in all cases were very small. Owing to the fact that college students were used as subjects as compared to the miscellaneous adult groups which were surveyed by other investigators, this study is not directly comparable with its predecessors. The difference in results may be a function of this difference in subjects; that is, it may merely reflect the shift in interests accompanying increasing age and change in occupation.

In their study Stoke and West introduced several controls hitherto not employed. Landis and Burtt had previously pointed out that immediate environment and occupation each had a noticeable effect upon the topics of conversation. For example, women standing before shop windows talked about

* The authors are indebted to Professor D. G. Paterson for his valuable suggestions in the preparation of this report.

clothes; similarly, marked differences were found in the conversational topics of individuals whose occupations were as different as those of college student and business man. In addition to these two factors Stoke and West attempted to hold constant age, time of conversation, place, social status, and type of person with whom the conversation was held.

The present study is an attempt to investigate sex differences in conversation when the environment immediately preceding the conversation is held constant for all the subjects. All controls listed by Stoke and West, with the exception of age, are employed. The study, therefore, serves to check, in the presence of adequate controls, the validity of previous findings of conversational sex differences among adults.

METHOD

The investigation to be reported was conducted by the authors at thirteen regular concerts of the Minneapolis Symphony Orchestra and at six University of Minnesota Artist Course concerts. Each of the three investigators listened to a random sample of conversations as the patrons of the main floor seats of the auditorium conversed in the main floor lobby during the intermission. Since the intermission was always of ten minutes duration, an average of only ten conversations per investigator could be tabulated at each concert.

Each of the investigators carried concealed in his hand a small prepared card listing the eleven topics of conversation most frequently recorded by other experimenters. As the study progressed, two additional topics which occurred frequently were added. As each conversation was overheard, a tally mark was made opposite the proper topic on the card. A conversation concerning the speaker himself was tabulated opposite the appropriate topic (business, travel, etc.) rather than under the classification "self," used in other investigations (2) (3).

To conform with previous studies the speakers were originally classified under four groupings: men to men; women

to women; men to women; and women to men. Because of the impossibility of determining which individual of a mixed group was responsible for originating the conversation overheard, the latter two classifications were combined during the computation of results to form a classification "mixed group."

Since the price of admission for seats on the main floor was high, exceeding by a considerable amount that of admission to the mezzanine and balcony, it may reasonably be assumed that the subjects of the study are relatively homogeneous with respect to socio-economic status. For the same reason, it is safe to assume that the majority of the subjects came from the higher business and professional occupational groups. As a consequence of confining the study to conversations occurring in the main floor lobby during intermission, the factors of immediate environment, place of conversation, and time of conversation were held constant. In addition, as stated above, the fact that all subjects had listened for approximately an hour to the same type of music, made possible the control of the environment immediately preceding the conversation.

The reliability of the method was found to be high, as will be shown below in the discussion of results.

RESULTS

A total of 601 conversations was tabulated. To insure against any influence of partial results being exerted on one or more observers, no results were computed until all the data had been obtained. Table I presents in terms of percentage of number of conversations the relative frequency of each topic among men, women, and mixed groups. The Artist Course concerts and symphony concerts are first considered separately and are then pooled. Upon inspection of the table the close correspondence between the artist and symphony series becomes apparent.[1] Because of this similarity discussion is limited to the pooled results.

[1] When the number of conversations recorded for each topic at the artist series was correlated with the number recorded for each topic at the symphony series, an r of $+.90$ was obtained.

TABLE I

Percentage Frequency of Conversations Devoted to Each Topic Classified by Sex and Type of Concert

	MEN TO MEN			WOMEN TO WOMEN			MIXED GROUPS			Grand Total
	Artist Course	Symphony Concert	Total	Artist Course	Symphony Concert	Total	Artist Course	Symphony Concert	Total	
NO. OF CONVERSATIONS:	64	103	167	78	147	225	72	137	209	601
Topics of Conversation:										
1. Artists	23	25	24	21	12	15	27	23	24	21
2. Women	10	13	12	26	32	30	4	10	8	18
3. Men	14	14	14	18	17	17	18	12	14	16
4. Other amusements	13	8	10	10	7	8	13	17	15	11
5. Money and business	20	18	19	2	1	2	4	8	7	8
6. Immediate surroundings	2	4	3	8	8	8	14	10	12	8
7. Clothes	0	2	1	8	10	9	3	2	2	5
8. Weather	6	3	4	1	1	1	8	3	5	3
9. Groups of people	0	2	1	4	5	4	1	5	4	3
10. Travel	3	1	2	2	5	4	4	6	5	3
11. Sports	6	6	6	0	0	0	0	1	1	2
12. Health	3	2	2	0	1	1	4	2	2	2
13. Current events	0	1	1	0	1	1	0	1	1	1
Total	100	100	100	100	100	100	100	100	100	100

An examination of the "Total" columns of Table I indicates that men, women, and mixed groups differ markedly in the percentages of their total conversations devoted to certain topics. Table II gives the critical ratios of the obtained differences between these percentages, as calculated by the

TABLE II

Critical Ratios for the Differences Between the Percentages of Conversations by Men, Women, and Mixed Groups

	MEN TO MEN VS. WOMEN TO WOMEN	MEN TO MEN VS. MIXED	WOMEN TO WOMEN VS. MIXED
Topics of Conversation:			
1. Artists	2.47	.1	2.50
2. Women	4.57	1.35	6.34
3. Men	.78	0.00	1.42
4. Other amusements	.41	1.77	2.45
5. Money and business	5.5	3.51	2.52
6. Immediate surroundings	2.2	3.4	1.28
7. Clothes	3.7	.89	2.97
8. Weather	1.98	.365	2.47
9. Groups of people	2.0	1.73	.33
10. Travel	1.31	1.94	.7
11. Sports	*	2.63	*
12. Health	1.12	0.00	1.22
13. Current events	.27	.14	.17

* Since this topic was never tabulated in the conversations of women with women, no critical ratios were obtained.

formula for determining the significance of the difference between proportions.[2]

A consideration of the critical ratio of 5.5 in the column "Men to Men vs. Women to Women" and in the row opposite "Money and business" will illustrate the derivation of Table II and its relationship to Table I. From Table I it may be seen that men devoted 19 per cent of their conversation to money and business, while women devoted only 2 per cent to the same topic. The critical ratio of the difference between these percentages is 5.5, which indicates that the obtained difference is statistically significant.

DISCUSSION OF RESULTS

An outstanding feature of Table I is the frequency with which all types of subjects conversed about the concert and

[2] Yule, G. V., An Introduction to the Theory of Statistics, 1924, Pp. 269, Formula 6.

symphony artists. This fact points clearly to the importance of the environment preceding the conversation as a determinant of the conversational topic, and offers empirical evidence as to the necessity of holding this factor constant for all subjects.

The possible influence which the failure to utilize this control may have had upon previous studies, is illustrated by the large percentage of men's conversations which have been devoted to business and money. Since Moore, Landis and Burtt, and Landis presumably collected their data on streets in business districts, it is highly probable that a majority of the men whose conversations they overheard, were at the time either leaving their business or on some business errand.

Aside from the artists, the predominant topics for men were, in order of frequency: business and money, other men, women, other amusements,[3] and sports. For women the predominant topics are: other women, men, clothes, other amusements, and immediate surroundings.[4] Clear and significant sex differences are found for only four topics, a decidedly greater degree of the women's conversations being about other women and clothes, and of the men's about business and money, and sports. If the topics "men," "women," and "groups of people" are added to form a composite topic, "personalities," another sex difference appears, this topic comprising 27 per cent of the men's conversations as compared to 51 per cent of the women's.

The leading topics of the mixed groups are, in addition to the artists: other amusements, men, immediate surroundings, women, and money and business. Of these topics, one, "women," is emphasized more in the conversations of women with women, one, "money and business," is emphasized more in the conversations of men with men, and three, "other amusements," "immediate surroundings," and "men," are emphasized to approximately the same degree in the conver-

[3] This topic includes all amusements not otherwise listed.

[4] This topic includes everything in the immediate environment not otherwise listed (*e.g.* lobby decorations).

sations of each. Thus, there is no evidence to support the claim (3) that one sex tends to adapt its conversation to the special interests of the other. On the contrary it seems that mixed group conversations are predominantly on topics in which the sexes separately have an approximately equal interest. Often this means, as in the case of conversations about "other amusements" and "immediate surroundings," topics in which they separately have relatively little interest.

As was pointed out before, Moore, Landis and Burtt, Landis, and Sleeper found that men talk predominantly about "business and money," and "amusements and sports," while the most frequent topics of women's conversations are "personalities" and "clothes." The present investigation yields substantially the same results, with the exception that our men exhibited a relatively greater interest in "men" and in "women." There are, however, numerous differences in the size of percentages of conversations devoted to the leading topics, as may be illustrated by a comparison of the frequency with which the men in this study and those in the four studies quoted above discussed "business and money." For the former, this topic occupied 19 per cent of the total conversations; for the latter, an average of 46 per cent.

It is impossible to account for these discrepancies completely because of the dissimilar conditions under which the data were gathered. It is altogether possible that this difference in conditions may account for the apparent differences in results. To illustrate, if we eliminate conversations about "artists," under the assumption that they represent the effect of the immediately preceding environment, the percentage of men's conversation devoted to "business and money" increases from 19 per cent to 25 per cent. If it were possible, in the studies of Moore, Landis and Burtt, and Landis, to remove the probable influence of gathering men's conversations on business streets, the percentage of such conversations devoted to "business and money" would undoubtedly drop. In such case the present differences in results would be greatly minimized.

An effort has been made to determine the reliability of the method and the adequacy of the sample. The odd-even reliability coefficient (ρ) for the data of each observer has been computed and is as follows:

Raw Coefficients	Coefficients corrected by Spearman-Brown formula
A = +.81 ± .06	+.90
B = +.90 ± .03	+.95
C = +.92 ± .03	+.96

The data of each observer correlated against every other yields the following coefficients (ρ):

A vs. B = +.85 ± .05
A vs. C = +.90 ± .03
B vs. C = +.95 ± .02

The odd-even reliability coefficient (ρ) for the pooled data of all observers is +.93 ± .02, which when corrected by the Spearman-Brown formula, becomes +.96.

Inasmuch as the sampling covered a period of six months and none of the observers knew the results being secured, it seems improbable that any constant error could have been operative. It is reasonable to believe, therefore, that these coefficients indicate that a random sample of the groups studied has been obtained and that the method used was reliable.

SUMMARY

Samples from 601 conversations of relatively homogeneous groups of adults have been gathered. Socio-economic status, place of conversation, time of conversation, and environment immediately preceding the conversation have been held constant. The leading topics of men's conversation are money and business, other men, women, other amusements, and sports.

The leading topics of women's conversations are other women, men, clothes, other amusements, and immediate surroundings. Clear sex differences are found in four topics: money and business, sports, women, and clothes, the men conversing more about the first two topics, the women more about the latter. Women converse to a significantly greater degree than men about "personalities." The conversation of mixed groups tends to be dominated by topics of either equal or little interest to the sexes conversing separately.

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MEASURING INSTITUTIONAL ADJUSTMENT OF MENTALLY DEFICIENT BOYS

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STUDENTS of human behavior have long felt the need for an adequate technique for the measurement of social behavior and adjustment. Similarly, administrative head of training and correctional institutions have repeatedly expressed the need for a simple, yet valid and reliable instrument for the measurement of the social adaptation of the individuals in their charge. The Vineland (Yepsen) Adjustment Score Card[1] was designed to meet this need. The Score Card is reported to be the result of a careful clinical analysis of individual deviates in a large group of children. It is based upon quantitative and objective statements of social adaptation as a result of these clinical studies.

The Adjustment Score Card consists of fourteen major categories dealing with certain phases of the adjustment of the individual to his environment. Under these categories are seventy items, each descriptive of an act done. Four to seven items describe the individual being rated. Weights are assigned to the various items. The score of the hypothetical

[1] Yepsen, L. N., The Measurement of Social Behavior, *Proceedings and Addresses of the American Association for the Study of the Feeble-Minded*, XXXIII, (1928). Pp. 124–31.

Yepsen, L. N., Measuring Social Adaptation, *Journal of Juvenile Research*, XII, (1928). Pp. 254–60.

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Yepsen, L. N., A Personal Behavior Card, *Journal of Applied Psychology*, XII, (1928). Pp. 140–47.

Yepsen, L. N., Manual of Directions for the Use of the Adjustment Score Card, Department of Research, The Training School, Vineland, N. J., Series 1928, Number 19, (November, 1928). Pp. 6.

average individual would be one hundred, being the modal activity of the fourteen items statistically weighted. The Score Card may be used with any age, grade, or sex. Rating may be done by any one who knows the subject being rated.

The chief advantages of the Yepsen Score Card are:

1. It is objective. Statements which indicate something the person actually does were substituted for such descriptive adjectives as "good," "fair," and "poor," and such numerical designations as 1, 2, 3. 2. It is valid. The total score does differentiate the adjusted from the maladjusted. 3. It is reliable. A close agreement was found between repeated scores. The correlation between two surveys was .77. 4. Little relationship was found to exist between the scores on the Score Card and mental level. The correlation between the Score Card scores and the Binet test age was reported to be .05, and the correlation between the same scores and the Binet Intelligence Quotient was found by Yepsen to be .15. 5. The Score Card is very helpful in arriving at an adequate picture of the individual's behavior difficulties; it is helpful to the clinician in making a complete survey of the individual's specific difficulties.

Oosthuizen[2] reported a study on the reliability and validity of the Adjustment Score Card. He concluded: "The results obtained tallied with those of Yepsen in public schools, state schools for delinquents, and so on."[3] He further concluded: "The method would seem to satisfy all the conditions stipulated . . . the claim that the method is workable and efficient in objectively measuring conduct is fully justified."[4] Oosthuizen found the correlation between the scores on the Adjustment Score Card and the major criteria, the teachers' judgments, to be .81 with a P.E. of .030.

[2] Oosthuizen, P. J., Efficiency of the Vineland Adjustment Score Card for Measuring Social Behavior, *Journal of Educational Research*, XXIII, (1931). Pp. 280–87.

[3] *Ibid.*, p. 283.

[4] *Ibid.*, pp. 286–87.

THE PROBLEM

The present study consists of a comparison of the Vineland (Yepsen) Adjustment Score Card scores of fifty very well adjusted and fifty seriously maladjusted mentally deficient boys in a state institution.[5] The purpose of this study is to determine the validity of the Score Card. An abbreviated form, based upon an item analysis of the Score Card will also be presented.

This study is one of a series of investigations on the value of commonly used tests and scales in the diagnosis of maladjustment.[6]

METHOD OF PROCEDURE

Constitution of the two groups:

The two groups were highly equated in nationality and race, sex, chronological age, Binet test age, number of months in the colony prior to the study, and in general physical health. All the subjects in the two groups ranged between 13 years 1 month and 32 years 11 months in chronological age; between 6 years and 15 years 7 months in Binet test age; between 8 months and 15 years 10 months' residence in the colony. The differences in months between the means of the two groups in chronological age, Binet test age, and months in the institution were $.30 \pm 6.585$,[7] $.44 \pm 2.915$, and $.04 \pm 4.709$, respectively. Of the boys in each group, 52 per cent were rated average by the resident physician, 6 per cent below average, and 42 per cent above average in general physical health.

[5] This study was made at the New Lisbon, N. J., State Colony.

[6] Brill, M., A Comparative Study of the Performance of Adjusted and Maladjusted Mentally Deficient Boys on Twenty-Two Tests and Scales. Ph.D. Thesis. New York University, 1935.

Brill, M. Psychometric Data as Indices of Instability, *Proceedings and Addresses of the American Association on Mental Deficiency*, XL, (1935). Pp. 421–34.

[7] The P.E. is used throughout the study to indicate the reliability of statistical values.

Steps in the selection of the subjects:

1. Three hundred thirty-three boys were rated on a five point scale by the superintendent, boys' supervisor, director of industry, and educational director. Each boy was thus rated on his social adjustment in general and also on educational or vocational adjustment. Each rater also indicated whether he was sure, fairly sure, or not sure of his rating in the case of each boy.

2. Two lists were prepared on the basis of the previous ratings:
   (1) A list of ninety-seven boys rated unanimously as either Good or Very Good in both general social and vocational or educational adjustment.
   (2) A list of one hundred nine boys who were unanimously rated as either Poor or Very Poor in both general social and vocational or educational adjustment.

3. The boys on lists (1) and (2) were again rated on a three point scale by the boys' supervisor, who was very well informed on the adjustment of every boy in the colony. After this rating, the lists of the very well adjusted and the seriously maladjusted consisted of ninety-four and fifty-seven boys respectively. These two lists were used for the final selection of the subjects. The equating was done by matching person to person for these two lists with reference to the criteria set up above.

Comparing the two groups in continuous social adjustment:

The colony is an open institution and the boys can move about freely as in a miniature community. Those individuals, however, who are maladjusted in the ordinary institutional environment, and are considered either dangerous to themselves or to the welfare of other patients, are placed in a detention cottage (later referred to as D.C.). For some of the minor offenders, spending a day at the detention cottage was found impressive enough to keep them out of trouble for a

long while. Others must be kept in this cottage for extended periods, because whenever they return to the ordinary open cottages, they very soon get into trouble again. The detention cottage is different from the open cottage only in that the boys in it are kept under close supervision twenty-four hours a day. The policy is to take the maladjusted boys out of that environment in which they failed to adjust. An analysis of the detention cottage records of the boys indicated, however, that a number of them were committed time and again, up to fourteen times. This indicates that each boy is always given a chance to readjust himself to the ordinary institutional environment. The following facts concerning the institutional adjustment of the boys in the two groups were brought out from a study of their detention cottage records:

	Adjusted	*Maladjusted*
1. Number of days in colony for past 2½ years	40177	38942
2. Number of days in D.C. for past 2½ years	471	11502
3. D.C. Index (ratio of 2 over 1)	.012	.295
4. Number of commitments to D.C.	49	299
5. Mean number of commitments per individual	.98	5.98
6. Per cent of boys never committed to D.C.	56	0
7. Number of recommitments to D.C.	36	249
8. Mean number of recommitments per individual	.52	4.98
9. Per cent returned from jails and State Hospitals	0	14.03
10. Per cent committed for minor offenses	10.20	3.01
11. Ratio between Adjusted and Maladjusted in 3	1	24.58
12. Ratio between Adjusted and Maladjusted in 5	1	6.10
13. Ratio between Adjusted and Maladjusted in 8	1	9.58

More data concerning the adjustment of the two groups may be found elsewhere.[8]

To summarize, an analysis of the detention cottage data for the two groups has clearly shown that the Adjusted and Maladjusted were reliably different in continuous social adjustment for at least the past two and a half years. In order to determine the validity of the Vineland-(Yepsen) Adjustment Score Card, the Adjusted and the Maladjusted were rated by the cottage parents of the boys in the two groups.

TABLE I

The Vineland Adjustment Score Card Scores of the Two Groups

	ADJUSTED	MALADJUSTED
Range	73–138	27–96
Mean ± P.E.$_M$	107.04 ± 1.60	59.30 ± 1.99
S.D.	16.78	20.85
Difference of the means ± P.E.$_D$		47.74 ± 2.55
Critical ratio (D/P.E.$_D$)		18.70

A study of Table I reveals that the Vineland (Yepsen) Adjustment Score Card differentiated conclusively between the Adjusted and the Maladjusted. The critical ratio of 18.70 is more than necessary to establish the fact that the two groups were reliably different in their Adjustment Score Card scores. The amount of overlapping was found to be negligible. Only four cases of the Adjusted fell within the range of the mean plus one S.D. of the Maladjusted. Similarly, only four cases of the Maladjusted fell within the range of the mean minus one S.D. of the Adjusted. The fact that each of the two distributions tend to heterogeneity indicates that the Adjustment Score Card measures not only absolute or gross differences in social adjustment, but also variations or degrees of adjustment within the well-adjusted group and also within the seriously maladjusted group.

An item analysis of the Adjustment Score Card:

Yepsen, the author of the Vineland Score Card, reports: "The surveys we have carried out in our institution have in-

[8] Brill, M., *op. cit.*

dicated that it does differentiate between the well-adjusted and the maladjusted individuals and that it definitizes the reasons for this type of adjustment.''[9] The great advantage of the Vineland Adjustment Score Card over other available techniques is that it definitizes the specific behavior patterns that cause an individual to be well-adjusted or maladjusted. To study the behavior patterns usually associated with adjustment and those with maladjustment, an item analysis of the Vineland Score Card was made. Two lists of items were drawn up on the basis of this analysis:

1. The items in the Score Card most often checked for the adjusted boys. This list is later referred to as the behavior-patterns of adjustment.
2. The items in the Score Card most often checked for the maladjusted boys. This list is later referred to as the behavior-patterns of maladjustment.

The two lists follow, and the items in each list are given in order of the size of their critical ratios:

ITEMS	CRITICAL RATIOS
Behavior-Patterns of Maladjustment:	
1. Careful of own and others' property	13.41
2. Adjusts self to social situation	10.06
3. Always courteous, language good	9.05
4. Cooperates, is considerate of others	9.91
5. Never has to be spoken to and is courteous, respectful	8.33
6. In reliability, can be left to own resources	6.88
7. Not known to tell falsehood	6.79
8. Carries task to satisfactory completion to best of ability	6.44
9. Tries to guide others in recognition of personal rights	6.22
10. In discipline, responds to positive measures	5.46
11. Willingly a member of group activities	4.98
12. Requires only occasional check-up	4.67
13. In attitude towards others, cooperates, is considerate, a leader	4.57
14. Occasional falsehood	4.48
15. Uses new methods of own accord with good judgment	4.46
16. Others, accept him readily as one of group	4.01
17. Sees something to be done and does it in an approved manner	3.86
18. A leader in group sports and activities	3.76
19. Works with only occasional direction	3.69

[9] Yepsen, L. N., The Objective Measurement of Social Behavior, *op. cit.*, p. 39.

	ITEMS	CRITICAL RATIOS
20.	Works without direction	3.69
21.	Recognizes rights of others personally	3.68
22.	Seldom requires discipline	3.35
23.	Others choose him as a leader	3.02
24.	Must be given only few explanations and works well	2.50
25.	Sought out to enter group activities	2.14
26.	Seek his companionship	2.06
27.	Begins new task readily upon suggestion	1.54
28.	In reliability in general, initial word enough	1.49
29.	In attitude towards superiors, grumbles regarding necessary tasks	1.10
30.	Makes the best of any situation	.65
31.	Works with only direction	.58
32.	Enjoys being by self to extent of being reclusive	.42
	Behavior-Patterns of Adjustment:	
1.	Word not to be relied upon	11.45
2.	In discipline, special measures needed	8.50
3.	Must be watched continually	8.33
4.	Always wants something different	7.46
5.	Gets others' property by unfair means—threats, unequal trades, etc.	7.13
6.	In language and language attitude is profane, vulgar	6.87
7.	In work, requires constant supervision	6.24
8.	Never notices things to be done	6.22
9.	In attitude toward others is cruel, a "bully"	6.22
10.	In attitude toward others is rough but means well	6.19
11.	Destroys own and others' property	6.13
12.	In attitude towards superiors refuses to conform and has to be spoken to frequently	5.87
13.	In sociability is often sulky	5.47
14.	In sociability quarrels, fights, etc., with companions	5.46
15.	In languages and language attitude is saucy, talks back	4.80
16.	In work, most time refuses to work	4.80
17.	Must be given frequent attention	4.80
18.	Generally plays games of individual nature	4.43
19.	With regard to property is careless of everything	4.23
20.	Never does more than necessary	4.16
21.	With regard to property exercises usual care	3.86
22.	Others play with him only occasionally, not often	3.66
23.	Others ignore him and shun him	3.51
24.	Others consider him butt of crowd, pick on him	3.50
25.	Enters into group play unwillingly	3.31
26.	Actually purloins others' property	2.96
27.	Always complains about something	2.96
28.	Careful of own but not of others' property	2.64
29.	Often becomes dissatisfied	2.23
30.	Falsifies but readily admits falsehood	1.96
31.	Claims others' property but gives it up	1.75
32.	In discipline, deprivation of privileges enough	1.52
33.	Often does not tell the truth	1.52
34.	Interested in work at hand	1.43
35.	Willingly carries out instructions	.63

The following items were checked the same number of times for both groups:

1. Others accept him as a leader.
2. Seeks company of certain few.
3. Occasional flare-ups.

The items in the two lists of behavior-patterns usually associated with adjustment and maladjustment, are extremely helpful in understanding what is meant by the social group when either term is used. If an individual behaves in accordance with the items in the first list, he is considered well-adjusted by the social group of which he is a part. On the other hand, if he behaves in accordance with the items in the second list, he is considered maladjusted. The adjusted individual meets the requirements placed upon him by the social group. He is expected, for instance, to be "careful of own and others' property," to be "always courteous," to be "reliable," and the like. On the other hand, the maladjusted individual is characterized by his failure to meet the requirements placed upon him by the social group. His "word is not to be relied upon," he "always wants something different," and in language and language attitude, he is "profane, vulgar," and the like.

From the standpoint of clinical diagnosis and treatment of maladjustment, the value of the two lists of specific behavior patterns of adjustment and maladjustment cannot be overestimated. It remains to be determined experimentally whether or not all or many maladjusted individuals can be guided in breaking undesirable behavior patterns and in substituting for these other patterns which are socially desirable.

An abbreviated adjustment score card:

It has long been recognized that a rating scale in order to be useful must be simple and brief. The following abbreviated form of the Vineland (Yepsen) Adjustment Score Card is suggested. It is made up of the twenty-eight items in the original Score Card which differentiated most reliably between

An Abbreviated Form of the Vineland (Yepsen) Adjustment Score Card

DIRECTIONS: The names of the individuals you are to score are on the lines numbered from 1 to 10. The numbers at the top of the vertical lines refer to the same individuals. You will find on this blank 14 pairs of statements. *Check the one item in each pair which is most characteristic of the individual you are rating.* You may sometimes feel that neither item in the pair is "fair" to him, yet you are nevertheless to check that item in each pair which "fits" him best, or the one that describes him best.

NAME OR DATE	NAME OR DATE	NAME OR DATE	NAME OR DATE	NAME OR DATE
1	3	5	7	9
2	4	6	8	10

	1	2	3	4	5	6	7	8	9	10
1 ATTITUDE OF OTHERS TOWARD HIM										
Play with him only occasionally, not often										
Accept him readily as one of the group										
2 SOCIABILITY										
Adjusts himself to social situation										
Quarrels and fights with companions										
3 RELIABILITY IN GENERAL										
Must be watched continually										
Requires only occasional check-up										
4 TRUTHFULNESS										
He is not known to tell falsehoods										
His word is not to be relied upon										
5 ATTITUDE TOWARDS OTHERS										
He is cruel, a "bully"										
He cooperates, is considerate of others										
6 LANGUAGE AND LANGUAGE ATTITUDE										
He is profane, vulgar										
He is always courteous, language good										
7 PROPERTY ATTITUDE										
He recognizes rights of others personally										
Gets others' property by unfair means—threats, trades										
8 ATTITUDE TOWARDS SUPERIORS										
He willingly carries out instructions										
He refuses to conform and has to be spoken to often										
9 ACTIVITIES										
He is willingly a member of group activities										
He enters into group play unwillingly										
10 INDUSTRIOUSNESS										
He always wants something different										
Carries tasks to satisfactory completion to best of ability										
11 WORK (NON-INDUSTRIAL)										
He requires constant supervision										
He works without direction										
12 INITIATIVE										
He begins new tasks readily upon suggestion										
He never does more than necessary										
13 PROPERTY										
He is careful of own and others										
He is careless of everything										
14 DISCIPLINE										
Seldom requires discipline										
Special measures are needed for him										
±										
Score +										

the Adjusted and the Maladjusted in this study. No definite scoring method of this abbreviated form can be suggested at the present time.

Correlations:

The coefficients of correlation for all the one hundred subjects in this study, between the Adjustment Score Card scores and the Binet test ages, chronological ages, and number of months in the colony were found to be .168, .178, and .089 respectively. These coefficients of correlation are of little significance because the groups studied were by no means unselected.

Summary and Conclusions

A study was made of the validity of the Vineland (Yepsen) Adjustment Score Card. Two groups of mentally deficient boys in a state institution were highly equated in nationality, race, sex, chronological age, Binet test age, number of months in the institution, and general physical health. The only outstanding difference between the two groups was in the matter of continuous social adjustment. The criteria used in studying the adjustment of the two groups were the number of days committed to the detention cottage, the number of commitments, the number of recommitments, the detention cottage index, that is, the ratio of the number of days in the detention cottage over the number of days in the colony, and the like. The following conclusions may be drawn from this study:

1. The Vineland (Yepsen) Adjustment Score Card differentiates conclusively between adjusted and maladjusted mentally deficient boys in an institution.

2. The Score Card measures not only absolute or gross differences in social adjustment, but also variations or degrees of adjustment within the well-adjusted and the seriously maladjusted groups.

3. It was found by an item analysis that of the seventy items in the Score Card, thirty-six differentiated conclusively be-

tween the two groups; there was a strong probability that twelve others would differentiate reliably between them, and a marked probability that the same would hold true in the case of seven other items. In only three items was there no difference between the two groups.

4. The Score Card is a valuable clinical technique for the purpose of definitizing the specific behavior patterns and difficulties of maladjusted individuals. For the research worker, the Score Card is a valid instrument for differentiating the adjusted from the maladjusted.

5. An abbreviated form of the Score Card was developed in this study. This abbreviated form was made up of the fourteen pairs of items which differentiated most reliably between the Adjusted and the Maladjusted in this study. This Abbreviated Score Card should prove of value in measuring the institutional adjustment of mentally deficient boys.

In conclusion, the need for further research is suggested by this study. Two specific problems have been raised: (1) Is it possible to definitize the specific behavior difficulties of a socially maladjusted individual? and (2) What is the general therapeutic value of helping this individual break or remove undesirable behavior patterns and in their place substitute socially desirable ones? This does not imply that serious personality maladjustments can be treated in this manner, namely, by merely correcting specific behavior patterns which are socially undesirable. However, the writer feels that there are a great many socially maladjusted individuals whose difficulties are specific; should not the treatment of these individuals, then, also be specific?

THE IDENTIFICATION OF EMOTIONS IN ADVERTISING ILLUSTRATIONS

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SEVERAL studies have appeared in the literature which showed how successful were individuals in identifying emotions from photographs. The experiment reported in this article is similar in that it endeavored to see to what extent illustrations in advertisements were successful in portraying emotions and feeling states.

Eleven illustrations were taken from advertisements which stated clearly in the context what emotion or feeling state the human subject in the illustration was trying to portray. For example, advertisement A said "I knew you'd be *surprised.*" Advertisement B stated "Banish *fear* of blowouts."

The face only was mounted on a 3 x 4 black card. A list containing 14 emotions and feelings states was given to the subject along with the 11 pictures. Eleven in this list of 14 were identical with the 11 illustrations. The three others were supposedly unrelated to the pictures and were inserted as controls.

The subjects recorded which emotion or feeling state the illustration represented. He could use any one of the 14 words as many times as he wanted to, or not at all if he felt none matched the pictures. Each picture, however, had to be matched with one of the 14 words in the list.

The accompanying table which is to be read from left to right shows, as has been shown heretofore, that emotions and feeling states cannot be identified successfully from photographs. Only five of the pictures were identified more often correctly than incorrectly. Of these five, 62 per cent was the highest and the average was 45 per cent. The average for all eleven pictures was 26 per cent correct. This low success was due in part to the fact that the models were unsuccessful as

PERCENTAGE OF CORRECT RESPONSES

PHOTOGRAPHS	Emotions														
	Puzzled	Awed	Elated	Offended	Angry	Surprised	Satisfied	Jealous	Amused	Afraid	Worried	Embarrassed	Tired	Pained	
Puzzled	41	2	....	4	3	....	8	3	....	2	26	2	9	....	100%
Angry	3	10	5	2	7	44	3	1	17	4	....	1	1	2	100
Angry	2	2	5	4	62	4	....	3	3	3	....	....	....	12	100
Offended	4	3	1	46	4	....	3	30	1	....	2	1	2	3	100
Tired	1	1	....	....	....	....	7	2	....	....	34	1	35	19	100
Embarrassed	46	4	....	4	....	1	21	....	10	....	7	5	1	1	100
Worried	8	1	....	9	3	1	1	4	....	1	21	3	19	29	100
Pained	3	8	3	3	3	5	4	2	3	9	4	1	9	43	100
Pained	2	2	....	4	2	....	....	5	....	8	43	2	17	15	100
Afraid	6	1	....	6	38	2	....	16	2	13	7	1	4	4	100
Surprised	....	....	13	2	....	3	39	....	43						100

portrayers of the indicated emotional states. Another cause for low success is traceable to the fact that the situation evoking the emotion was unknown to the subjects serving in the experiment.

From the advertising point of view, however, it is of interest to note that some illustrations were much more effective than others, as measured in terms of identification success. One picture in which the model is supposed to be angry only 7 per cent of the subjects so labeled it. In another "angry" picture 62 per cent of the subjects made a correct identification. Pained was correctly identified 42 per cent of the cases in one "pained" picture and only 15 per cent in another. An analysis also shows embarassed correctly labeled 7 per cent of the time, afraid 13 per cent, and surprised 3 per cent.

As a check on our observations that there is a difference in the effectiveness of illustrations we presented to the same subjects the picture of a child of about three years of age. The picture was taken from an advertisement of strained vegetables. The subjects were asked to indicate whether they thought the child was a boy or a girl. Eighty-four per cent of the subjects said "it" was a girl although the caption in the advertisements said "*He* likes—vegetables."

The advertiser can probably increase the effectiveness of the emotional expression of his illustrations by a more careful selection and matching of context and illustration. It is our recommendation, however, that the advertiser have several photographs or illustrations each of which supposedly portrays the same emotion. These photographs would be presented to a selected and adequate group of subjects for identification. The one running the highest percentage of correct identification would be the one selected for use in the advertisement. In brief, the illustration should be selected experimentally rather than upon the whim of one or two individuals in the advertising office.

MECHANICAL APTITUDE AND SCHOOL ACHIEVEMENT OF NEGRO BOYS

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STATEMENT OF PROBLEM

A QUESTION of much interest and significance to those who are concerned with vocational guidance, vocational education, or shopwork is: To what extent mechanical aptitude has bearing of prognostic value upon achievement in academic work? In other words, the problem is: To what extent may we expect boys who are excellent, mediocre, or poor in mechanical work to be excellent, mediocre, or poor in academic work; and reversely.

Many people have assumed that failure to achieve academically was a sign of mechanical ability. Thus, a large number of the vocational departments and the industrial arts shops of our public school systems have been used as "dumping grounds" for all the dull, stupid, defective, and incorrigible students in the schools. The teachers of the practical work have frequently offered this condition as an alibi to explain any and all sorts of practices that exist in their departments and in their methods of teaching.

Several studies have been made, each with a rather limited number of students, to determine the correlation between a student's rating in general intelligence, as measured by standard tests, and his success in mechanical work in school.

In a study by Bird[1] of a group of 25 unselected vocational students, the coefficient of correlation between general intelligence and progress in learning machine-shopwork was only .14.

S. D. Horning[2] set out to obtain material in answer to the

[1] Bird, Verne A, "A Study in the Correlation of General Intelligence and Progress in Learning Machine-Shopwork," Industrial Education Magazine, September, 1922, p. 67.

[2] Horning, S. D., Tests of Prognostic Value in Mechanical Drawing, Industrial Education Magazine, Vol. XXIX, June, 1928, p. 441.

question of whether success in mechanical drawing can be predicted, and whether standardized intelligence tests have prognostic value toward such prediction. The conclusions point to the fact that the IQ rating has no prognostic value in selecting students for drawing. The conclusions go one step further and state that neither the MacQuarrie Test[3] nor the Stenquist Test[4] gives indication of having prognostic value for mechanical drawing.

The present study is an attempt to determine the relationship, if any, existing between mechanical aptitude and school achievement of Negro boys.

MEASURES OF MECHANICAL APTITUDE

This study is concerned with the mechanical aptitude and academic achievement of ninety-two Negro boys of the Dudley High School, Greensboro, North Carolina. The boys range in ages from twelve to nineteen and represent all four classes[5] in the school.

As a basis for determining mechanical aptitude, the following criteria were employed: (1) The Stenquist Mechanical Aptitude Picture Tests, Numbers I and II, and (2) Achievement in Shopwork.

"The Stenquist Test[6] No. I consists of a series of ninety-five problems presented in terms of pictures. In each problem the pupil is required to determine which one of five pictures belongs with each of five others. The pictures deal only with common mechanical objects. No particular trade is singled out and no picture relating to highly specialized skills is included. Test No. II consists partly of material similar to that of Test No. I

[3] MacQuarrie, T. W., A Test for Mechanical Ability, Hollywood; Southern California School Book Depository, 1925.

[4] Stenquist, John L., Mechanical Aptitude Test, Yonkers, New York; World Book Company, 1927.

[5] High School class norms were not considered since, according to Stenquist, grade (class) norms are of doubtful significance. Stenquist holds (Stenquist Manual of Directions, p. 14) that mechanical ability does not vary with grade as it does with age.

[6] *Ibid.*, p. 12.

and also of questions applied to cuts of machines and machine parts. The questions are of general nature and do not presuppose that the pupil has necessarily had actual first-hand experience with the particular machines shown. They call for keen perception of mechanical objects and the ability to reason out a mechanical problem."

The raw score is the actual number of correct answers in a given test. The T-score so-named by Professor McCall in honor of Professors Thorndike and Terman is based upon the Standard Deviation of the measures of ability of unselected 12-year-old children (children ranging in age from 12 years, 0 months to 13 years, 0 months.

The Stenquist Mechanical Aptitude Tests were given to the boys and from the raw scores of the various age-groups, T-scores were obtained. The T-scale[7] extends from 0 to 100. The value 50 represents the mean or median ability of 12-year-olds. Each 10 points on the scale represents 1 S.D. of the distribution of scores of 12-year-olds. The zero point is therefore minus 5 S.D. and the 100 point is plus 5 S.D. In practice, T-scores fall within a range from 15 to 85.

Stenquist suggests[8] that both tests I and II be given whenever possible because "the average result of the two tests is more reliable as a measure of mechanical ability than either test taken separately." He further suggests that "the simplest procedure in combining the two scores is to average the two T-scores."

Stenquist correlated the scores made, on Tests I and II combined, by the boys in a private school, with their shop grades. The coefficients of correlation determined separately for fifteen classes had a median value of .67 and ranged as high as .84 in the case of pupils who were well known by the instructors who could therefore more accurately rank the pupils. The foregoing is an indication of validity of the Stenquist Tests as a

[7] For details, see "How to Measure in Education," by William A. McCall, pp. 275–307.

[8] Stenquist, J. L., Stenquist Mechanical Aptitude Tests Manuals of Directions, World Book Company, Yonkers, N. Y.

measure of mechanical aptitude. The correlation between Tests I and II for 230 fifth-, sixth-, seventh-, and eighth-grade boys was found by Stenquist to be .68. The correlation between Tests I and II for the Negro high school boys was found to be .65. This is an indication that the two tests not only measure the same things with respect to the elementary school pupils but that they measure the same things with respect to the high school boys as well.

In the present study the grades made in shopwork were recorded and used as another criterion of achievement in shopwork. In order to render the shop grades more indicative of shop achievement an attempt was made to establish some criterion for shop accomplishment in addition to shop grades. To accomplish this, the shop teacher was asked to give the monthly grades of each boy for one semester. The grades were averaged and recorded. After a lapse of thirty days, the shop teacher was again requested to rate each boy, but this time to place each boy into one of five groups,[9] as follows: (1) The slow and inaccurate; (2) the rapid and inaccurate; (3) the slow and accurate; (4) the rapid and accurate; and (5) the average student.

The purpose of the rating was to indicate the relationship between efficiency in mechanical work as judged by the foregoing categories and the grades[10] given by the shop teacher. The results showed that of 18 boys who received the "fast and accurate" rating, 7 received "A's" in shopwork and 11 received "B's." Of the 40 boys who received the "average" efficiency rating, 35 received "B's" and 5 received "C's." Of the 17 who received the "fast and inaccurate" rating, 7 received "B's," 7 received "C's" and 3 received "D's." Of the 7 boys who received the "slow and accurate" rating, 6 received "B's" and one received "C." And of the 10 boys

[9] Payne, A. F., Methods of Teaching the Industrial Subjects, p. 157. McGraw-Hill Book Co. (Note: The writer added the fifth category.)

[10] The Marking System of the school was as follows: "A" = above average; "B" = average; "C" = below average but passing; (D) = unsatisfactory.

who received the "slow and inaccurate" rating, 2 received "B's," 6 received "C's" and 2 received "D's." Summarizing the efficiency distribution with respect to ratings, we have 18 who received the "fast and accurate" rating, 40 who received the "average" rating, 17 the "fast and inaccurate" rating, 7 the "slow and accurate" rating, and 10 the "slow and inaccurate" rating.[11] From these data we can see that the largest number of students (40) who received the "average" efficiency rating also received average shop grades and that the remainder distribute themselves in a fairly normal fashion.

MEASURES OF ACADEMIC ACHIEVEMENT

The grades made in academic work were used as the criterion for academic achievement. In order to increase the reliability of the academic grades as measures of academic achievement, the ratings of each boy for one semester were obtained. They represented the ratings given by eight teachers and included work in language (English and French), Science (biology, chemistry, and physics), and mathematics (algebra and geometry). Each boy's four monthly ratings[12] in each subject were averaged and that average was considered as his final grade in that particular subject. Then each boy's averages, in language, science, and mathematics respectively, were added, divided by three and that figure was taken as his general academic average.

METHODS OF FINDING RELATIONSHIPS

The several methods employed in finding the relationships between mechanical aptitude and achievement in the various school subjects were as follows: (1) Method of rank-differences; (2) product-moment method; and the (3) quartile-retention method.

[11] Contrary to the familiar maxim, "slow but sure" (paraphrased, means slow but accurate), the majority of those who were rated as "slow" were likewise rated as "Inaccurate" (not sure).

[12] There are four months in a school semester.

According to Garrett,[13] no measure can be taken as a reliable indication of the amount of correlation where the number of cases falls under 30; however, the method of rank-differences may be used in as few cases as 12. This method shows the presence or absence of correlation rather than the amount, and was used where the number of cases was relatively small.

The product-moment method was used because it takes account of both the size of the score and its position in the series. The rank-difference method takes account only of the position of the items in the series.

The quartile-retention method gives an opportunity for one to get a quick approximation of relationship.

The rank-difference method was used with the various age-groups to find the correlation between the Stenquist Test scores and the grades made in the various academic subjects. It was also used to correlate the grades in shopwork with the grades in the various academic subjects. The quartile-retention relationships were indicated in the group of boys as a whole.

The product-moment method was also used with the group as a whole but to correlate grades in shopwork with grades in general academic achievement.[14] This latter method was also employed to correlate scores made on the Stenquist Tests with scores in general academic achievement.

PRESENTATION OF DATA

Coefficients of correlation are interpreted as follows: a coefficient of 0 means that no correlation exists, and generally speaking, a coefficient of .30 or less means very little agreement. A coefficient between .30 and .50 means a moderate amount of agreement; a coefficient between .50 and .75 indicates fairly close relationship; and a correlation between .75 and 1.0 indicates a high degree of relationship.

[13] Garrett, H. E., Statistics in Psychology and Education, 1927, p. 190, Longmans, Green and Company, New York, N. Y.

[14] The Average of the Achievements in Language, Science and Mathematics, respectively.

RANK-DIFFERENCE PRESENTATIONS

(Stenquist Test Scores and Academic Grades)

The correlations[15] between the Stenquist Test scores and the academic grades for boys ranging in ages from 13 years to 16 years, inclusive, are: .15; −.07, .02, .30. This indicates a very low relationship. The correlation of −.07 is negative. A correlation of −1.0 would indicate a perfect inverse relation; that is, a high degree of ability in shopwork would be an indication of a low degree of ability in academic work, and reversely. The negative correlation, −.07, shown in the case of the 14-year-old boys, therefore, indicates a very close approach to zero or no correlation. The small number of cases, however, does not warrant such a conclusion. The small numbers of 12-, 17-, 18-, and 19-year-old boys do not justify one's presenting the coefficients of correlation.

The correlations between the shop grades and the academic grades for boys ranging in ages from 13 years to 16 years are: .18, .15, −.18, .33. With the exception of the correlation, .33, between shop grades and academic grades for 16-year-old boys, the above coefficients are almost negligible.

RANK-DIFFERENCE PRESENTATIONS

(Shop Grades and Academic Grades)

The correlations between grades in shopwork and grades in language, science, and mathematics respectively are given on the following page.

Though the number of boys of each age-group is small, the data indicate that there is a higher correlation between achievement in shopwork and achievement in science or achievement in mathematics than there is between achievement in shopwork and achievement in language.

CORRELATIONS BY THE QUARTILE-RETENTION METHOD

Boys of the upper and lower quartiles in shopwork tend to retain their relative positions in academic work, and reversely.

[15] Garrett, *op. cit.*, pp. 190–192.

13-Year-Old Boys	Total Number 15	
Shopwork-Language r = .36	Shopwork-Science r = .45	Shopwork-Mathematics r = .43
14-Year-Old Boys	Total Number 21	
Shopwork-Language r = .06	Shopwork-Science r = .88	Shopwork-Mathematics r = .12
15-Year-Old Boys	Total Number 16	
Shopwork-Language r = .15	Shopwork-Science r = .09	Shopwork-Mathematics r = .16
16-Year-Old Boys and Over	Total Number 36	
Shopwork-Language r = .07	Shopwork-Science r = .33	Shopwork-Mathematics r = .37

Twenty-five boys who were in the first quartile in language were in the second quartile in shopwork; twenty-four who were in the first quartile in mathematics were in the second quartile in shopwork; twenty who were in the first quartile in science were in the second quartile in shopwork; and eighteen boys who were in the first quartile in all of their academic work (average of all academic grades) were in the second quartile in shopwork.

Thirty-three boys retained their same positions in language as in shopwork; twenty-two retained their same positions in mathematics as in shopwork; twenty-five retained their same positions in science as in shopwork; and twenty-eight retained their same positions in all of their academic work as in shopwork. The number retained in the same quartile plus those removed by one quartile in shopwork and language was sixty-nine; in shopwork and mathematics the number was seventy-four; in shopwork and science it was seventy-two; and in shopwork and all academic work the number retained in the same

quartile plus those removed by one quartile was seventy-three. The indication here is that if a boy ranks low in shopwork the chances are few that he will rank exceptionally high in any phase of academic work, and reversely. The implications to be drawn here are that the vocational and practical arts departments should not be used as "dumping grounds" for those who for one reason or another are not getting on well in their regular academic subjects, but that there should be a more detailed analysis of their special mental abilities before recommending for them any definite pursuit.

PRODUCT-MOMENT COEFFICIENT OF CORRELATION

The correlation[16] between the shop grades and all academic grades for the ninety-two boys was $.09 \pm .01$. The correlation between the Stenquist scores and the academic grades for the ninety-two boys was $.12 \pm .06$. Similar to the rank-difference correlation, the product-moment correlation indicates little relationship between mechanical aptitude and achievement in various school subjects.

SUMMARY AND CONCLUSIONS

1. Academic achievement has little prognostic value in predicting mechanical aptitude as measured by the Stenquist Mechanical Aptitude Picture Tests, Nos. I and II and/or by grades in shopwork.

2. High academic achievement should not be interpreted as an indication of mechanical aptitude nor should inability of an individual to get on well in academic work be interpreted as a sign of mechanical aptitude.

3. The low correlation between the Stenquist Tests and academic achievement seems to indicate that the aptitude tests do measure something other than intelligence.

4. Though the boys in the highest or in the lowest quartile of any academic class of considerable size may not retain their absolute positions in mechanical work, they rarely fall below

[16] Garrett, *op. cit.* p. 167.

or rise above (as the case may be) the average performance of their respective quartile groups in shopwork, and reversely.

5. Mechanical aptitude and academic achievement seem to demand different types of ability between which correlation may be found only to the extent that the elements involved are similar.

6. Though the Stenquist Tests seem to measure to some degree mechanical aptitude (indicated by the correlation which was found between the Tests and the shop grades of fifteen classes in a private school) there seems to be no reason for believing that the reactions to the situations in these Tests will reveal the way in which the individual will react to all mechanical situations.

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AMERICAN PSYCHOLOGISTS JUDGE FIFTY-THREE VOCATIONAL TESTS

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IN an effort to elicit information as to which tests American psychologists consider best for vocational guidance a questionnaire on tests was formulated. The questionnaire listed 53 well known tests, and asked those answering it to indicate opposite the name of each test (1) its value, using E to mean efficient and N.G. to mean inefficient; (2) the age range, sex, and any other important characteristics of subjects given the test by the psychologist filling in the questionnaire; (3) remarks; (4) also, the names of other tests recommended for vocational guidance or selection were requested.

The questionnaires were posted to 74 American psychologists, all members or associates of the American Psychological Association, who were listed in the 1935 Year Book of the Association as doing research in testing, vocational psychology, vocational guidance, or industrial psychology. An accompanying letter explained the purpose for which the information was being sought, that is, the aid in devising batteries of tests suitable for use with a juvenile Scottish population.

The returns obtained were as follows:* 38 questionnaires

* The author gratefully acknowledges the cooperation of the following psychologists: M. R. Trabue (U. S. Employment Service), R. W. Husband (Univ. of Wisconsin), G. L. Bergen (New York State Employment Service), G. E. Manson (Northwestern Univ.), W. P. Reed (Univ. of Wyoming), K. M. Cowdery, E. K. Strong, Jr., Reginald Bell, Noel Keys, and C. G. Wren (Stanford University), R. J. Triplett (Barnes Commercial School, Denver, Col.), R. H. Seashore (Univ. of Southern California), Joseph Miller (Wilkes-Barre Public Schools, Wilkes-Barre, Pa.), H. R. Taylor (Univ. of Oregon), A. T. Orner (Joint Psychological Service, Cleveland, O.), H. A. Toops and H. E. Burtt (Ohio State Univ.), Ramona Wallace and Norman Fenton (California Bureau of Juvenile R'sch), C. C. Upshall (State Normal School, Bellingham, Wash.), Emily Burr (Voca-

were returned to the author with information given about varying numbers of the tests listed. A few other people failed to mark the questionnaire, but sent lists of other tests on the market. Two psychologists wrote refusing to cooperate. The return of 38 questionnaires, 51.4 per cent, was most gratifying, and furnished the author with much valuable information, which is summarized in this paper.

The important facts about Table I are the following:

1. On the average 11.1 markings per test were made.

2. Of all the tests marked, on the average 73.7 per cent were judged efficient (E).

3. If the best known tests are arbitrarily considered as those which 50 per cent or more of the 38 psychologists returning the questionnaires marked as knowing, then there are seven best known tests:

(a) Personality Inventory (Bernreuter) (71.1 %).
(b) Vocational Interest Blank (Strong) (71.1 %).
(c) Otis Self-Administering Test of Mental Ability (68.4 %).
(d) MacQuarrie Test for Mechanical Ability (60.5 %).
(e) Minnesota Vocational Test for Clerical Workers (52.6 %).
(f) Finger and Tweezer Dexterity Tests (O'Connor) (50.0 %).

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tional Adjustment Bureau, New York City), L. R. Frazier (Kroger Grocery and Baking Co., Cincinnati, O.), M. J. Drake (James Monroe High School, New York City), C. L. Hull and A. S. Crawford (Yale Univ.), R. S. Uhrbrock (Procter and Gamble Co., Cincinnati, O.), Herbert Moore (Mount Holyoke College), M. E. Shimberg (Judge Baker Foundation, Boston, Mass.), W. E. Parker (Farm Credit Administration, St. Louis, Mo.), I. K. Wallace (Univ. of Rochester), Milicent Pond (Scovill Mfg. Co., Waterbury, Conn.), Gertrude Hildreth (Lincoln School, New York City), B. Altman & Co. (New York City), H. A. Copeland and Lorene Teegarden (Cincinnati Employment Center, O.), R. H. Mathewson (Norwalk, Conn.), J. V. Hanna, E. R. Henry, and Douglas Fryer (New York University), H. D. Kitson and J. B. Maller (T. C., Columbia Univ.), The State Civil Service Commission (Trenton, N. J.), E. B. South (N. Y. State College for Teachers), and E. O. Bregman (New York City).

TABLE I

Quantitative Classification of Replies to the Questionnaire

NAME OF TEST	NO. WHO JUDGED TEST E	NO. WHO JUDGED TEST N.G.	TOTAL WHO MARKED TEST	PER CENT TOTAL WHO MARKED TEST IS OF TOTAL WHO REPLIED TO QUESTIONNAIRE	PER CENT E IS OF TOTAL MARKED	PER CENT N.G. IS OF TOTAL MARKED
(1) Adjustment Inventory (Bell)	11	3	14	36.8	78.6	21.4
(2) Aids to the Vocational Interview (Achilles) Form B	13	0	13	34.2	100.0	0.0
(3) Aptitude Test for Nursing (Moss and Hunt)	3	3	6	15.8	50.0	50.0
(4) A–S Reaction Study (Allport)	12	5	17	44.7	70.6	29.4
(5) Bregman Language Completion Scale	3	3	6	15.8	50.0	50.0
(6) Cancellation Tests	5	4	9	23.7	55.6	44.4
(7) Clerical Test (Benge)	4	3	7	18.4	57.1	42.9
(8) Detroit Mechanical Aptitudes Examination	5	4	9	23.7	55.6	44.4
(9) Finger and Tweezer Dexterity Tests (O'Connor)	17	2	19	50.0	89.5	10.5
(10) Humm-Wadsworth Temperament Scale	3	5	8	21.1	37.5	62.5
(11) MacQuarrie Test for Mechanical Ability	13	10	23	60.5	56.5	43.5
(12) Minnesota Assembly Test	15	1	16	42.1	93.8	6.2
(13) Minnesota Card Sorting Test	9	1	10	26.3	90.0	10.0
(14) Minnesota Interest Analysis	8	2	10	26.3	80.0	20.0
(15) Minnesota Packing Blocks Test	8	1	9	23.7	88.9	11.1
(16) Minnesota Paper Form Board	14	1	15	39.5	93.3	6.7
(17) Minnesota Rate of Manipulation Test (Ziegler)	9	1	10	26.3	90.0	10.0
(18) Minnesota Spatial Relations	14	1	15	39.5	93.3	6.7
(19) Minnesota Vocational Test for Clerical Workers	19	1	20	52.6	95.0	5.0
(20) New Introversion Extroversion Test (Root)	0	4	4	10.5	0.0	100.0

TABLE I—(*Continued*)

NAME OF TEST	NO. WHO JUDGED TEST E	NO. WHO JUDGED TEST N.G.	TOTAL WHO MARKED TEST	PER CENT TOTAL WHO MARKED TEST IS OF TOTAL WHO REPLIED TO QUESTIONNAIRE	PER CENT E IS OF TOTAL MARKED	PER CENT N.G. IS OF TOTAL MARKED
(21) Nine Hole Steadiness Test	2	4	6	15.8	33.3	66.7
(22) Occupational Interest Blank for Women (Manson)	10	7	17	44.7	58.8	41.2
(23) O'Rourke Clerical Aptitude Test, Jr. Grade (Clerical Problems)	9	2	11	29.0	81.8	18.2
(24) O'Rourke Clerical Aptitude Test, Jr. Grade (Reasoning Test)	3	2	5	13.2	60.0	40.0
(25) O'Rourke Mechanical Aptitude Test, Jr. Grade	7	1	8	21.1	87.5	12.5
(26) Otis Group Intelligence Scale—Advanced	12	1	13	34.2	92.3	7.7
(27) Otis Self-Administering Test of Mental Ability (a) Intermediate (b) Higher	25	1	26	68.4	96.2	3.8
(28) Personality Inventory (Bernreuter)	14	13	27	71.1	51.9	48.1
(29) Pressey Senior Classification Test	8	0	8	21.1	100.0	0.0
(30) Pressey Senior Verifying Test	7	0	7	18.4	100.0	0.0
(31) Psychological Interview (Mac Nitt)	1	2	3	7.9	33.3	66.7
(32) Rating Scales	10	1	11	29.0	90.9	9.1
(33) Revised Alpha Examination (Form 5, Wells)	8	3	11	29.0	72.7	27.3
(34) Revision of A-S Reaction Study for Business Use (Beckman)	5	2	7	18.4	71.4	28.6
(35) Revised Minnesota Paper Form Board, Series AA and BB	9	1	10	26.3	90.0	10.0

TABLE I—(*Concluded*)

NAME OF TEST	NO. WHO JUDGED TEST E	NO. WHO JUDGED TEST N.G.	TOTAL WHO MARKED TEST	PER CENT TOTAL WHO MARKED TEST IS OF TOTAL WHO REPLIED TO QUESTIONNAIRE	PER CENT E IS OF TOTAL MARKED	PER CENT N.G. IS OF TOTAL MARKED
Stanford Motor Skills Unit						
(36) Brown Spool Packer	4	2	6	15.8	66.7	33.3
(37) Koerth Pursuit Rotor	4	2	6	15.8	66.7	33.3
(38) Miles Speed Rotor	5	2	7	18.4	71.4	28.6
(39) Motor Rhythm Synchrometer	5	2	7	18.4	71.4	28.6
(40) Serial Discrimeter	4	2	6	15.8	66.7	33.3
(41) Speed of Tapping on Telegraph Key	5	2	7	18.4	71.4	28.6
(42) Stenquist Assembly Test	13	5	18	47.4	72.2	27.7
(43) Stenquist Mechanical Aptitudes Test (Picture Tests) (a) Test I (b) Test II	8	11	19	50.0	42.1	57.9
(44) Test for Ability to Sell (Moss)	2	4	6	15.8	33.3	66.7
(45) Test VI Mental Alertness	9	0	9	23.7	100.0	0.0
(46) Three Hole Coordination Test	2	3	5	13.2	40.0	60.0
(47) Thurstone Attitude Scales	9	3	12	31.6	75.0	25.0
(48) Thurstone Examination in Clerical Work	8	3	11	29.0	72.7	27.3
(49) Thurstone Examination in Typing	2	2	4	10.5	50.0	50.0
(50) Vocational Interest Blank (Strong) Forms A, B, WA, WB	24	3	27	71.1	88.9	11.1
(51) Wiggly Block (O'Connor)	7	11	18	47.4	38.9	61.1
(52) Willoughby E. M. Scale	6	1	7	18.4	85.7	14.3
(53) Woodworth-Wells Substitution Test	2	2	4	10.5	50.0	50.0

(g) Stenquist Mechanical Aptitude Test (Picture Test) (50.0 %).

4. If the best tests are considered as those which 75 per cent or more of those marking a test classify as efficient, then the following 23 tests fall into this class:

(a) Aids to the Vocational Interview (100 %).
(b) Pressey Senior Classification Test (100 %).
(c) Pressey Senior Verifying Test (100 %).
(d) Test VI Mental Alertness (100 %).
(e) Otis Self-Administering Test of Mental Ability (96.2 %).
(f) Minnesota Vocational Test for Clerical Workers (95 %).
(g) Minnesota Assembly Test (93.8 %).
(h) Minnesota Spatial Relations Test (93.3 %).
(i) Minnesota Paper Form Board Test (93.3 %).
(j) Otis Group Intelligence Scale, Advanced (92.3 %).
(k) Rating Scales (90.9 %).
(l) Minnesota Card Sorting Test (90 %).
(m) Minnesota Rate of Manipulation Test (90 %).
(n) Revised Minnesota Paper Form Board Test (90 %).
(o) Finger and Tweezer Dexterity Tests (O'Connor) (89.5 %).
(p) Vocational Interest Blank (Strong) (88.9 %).
(q) Minnesota Packing Blocks Test (88.9 %).
(r) O'Rourke Mechanical Aptitude Test, Junior Grade, (87.5 %).
(s) Willoughby E. M. (Emotional Maturity) Scale (85.7 %).
(t) O'Rourke Clerical Aptitude Test (Clerical Problems) (81.8 %).
(u) Minnesota Interest Analysis (80 %).
(v) Adjustment Inventory (Bell) (78.6 %).
(w) Thurstone Attitude Scales (75 %).

It should be pointed out that the tests are not and cannot be equally well known, since some have been on the market a much shorter time than others. The percentages, therefore, reflect

TABLE II

Other Tests Recommended

	F		F
Intelligence Tests			
(1) Arthur Point Scale of Performance Tests	1	(22) Elwell-Fowlkes Bookkeeping Test	1
(2) Kuhlmann Revision of Binet-Simon Test	1	(23) Iowa High School Content Examinations	1
(3) Minnesota Test for Pre-School Children	1	(24) Marion-Monroe Diagnostic Reading Examination	1
(4) Ohio State University Psychological Test, Form 19	1	(25) Stanford Achievement Test	4
(5) Passalong Test (Alexander)	1		
(6) Pintner-Cunningham Primary Mental Test	1	*Personality, Interest or Attitude Tests, Rating Scales or Record Blanks*	
(7) Porteus Maze	1	(26) Aids to the Vocational Interview, Record Form A	1
(8) Revised Alpha Examination, Form 6	1	(27) Analysis of Work Interests (Miner)	1
(9) Scovill Classification Test	1	(28) Block and Symonds Student Questionnaire	1
(10) Stanford Revision of the Binet-Simon Test	2	(29) Interest Questionnaire for High School Students (Garretson and Symonds)	2
(11) Woodworth-Wells Easy and Hard Directions Test	1	(30) Maller Character Sketches	2
		(31) Minnesota Survey of Opinions	1
Tests of Special Aptitudes		(32) New York Rating Scale for School Habits	1
(12) English Vocabulary (O'Connor)	1	(33) Ohio College Association Rating Scale, Form O	1
(13) I. E. R. Assembly Test for Girls (Tocps)	1	(34) Personality and Interest Inventory (Hildreth)	1
(14) Kent-Shakow Form Board	1	(35) Personality Report (American Council on Education)	2
(15) Lewerenz Tests in Fundamental Abilities of Visual Art	2	(36) Study of Values (Allport-Vernon)	2
(16) Meier-Seashore Art Appreciation Test	2	(37) University of Rochester Record of Opinions Regarding Personal Characteristics	1
(17) Stanford Scientific Aptitude Test	1	(38) Vocational Interest Schedule (Thurstone)	1
(18) Stine Block Measuring Test			
Achievement Tests			
(19) Blackstone Stenographic Proficiency Test	1		
(20) Bronner General Information Test	1		
(21) Educational Research Bureau Typing Test	1		

only the current opinion as to the value of the tests. In some cases this opinion may change as a test becomes better known, or as new tests replace some of those now in use.

Table II gives a list of other tests recommended by those filling in the questionnaires. These tests are classified under four headings, test of (1) intelligence, (2) special aptitudes, (3) achievement, and (4) attitudes, interest or personality. The frequencies of the recommendations are also given.

SUMMARY

1. A questionnaire listing 53 well known tests was sent to 74 American psychologists doing research work concerned with testing. They were asked to assess the value of the tests for vocational guidance, to indicate the characteristics of any group upon which they had used the tests, to make any other remarks, and to list any other tests for vocational guidance or selection.

2. Thirty-eight psychologists (51.4 %) filled in the questionnaire, and a few more sent the writer other helpful information. Two people wrote refusing to cooperate.

3. A quantative analysis of the replies is given, showing the number and percentage of the marked tests which were considered efficient (E) and inefficient (N. G.). The total number of those who marked each test and the percentage this is of the total 38 who filled in the questionnaires are also given.

4. On the basis of the quantitative analysis conclusions are drawn as to:

(a) The average markings per test.

(b) The average percentage of tests judged efficient.

(c) The 7 best known tests.

(d) The 23 best (most efficient) tests.

5. The names of 38 other tests which were recommended are given. The frequency with which they were recommended is also reported.

SCORING INTELLIGENCE TESTS BY WEIGHT*

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PROBLEMS

THE regular method of administering intelligence tests is one in which answers are written by the student on a test booklet. This procedure consumes tests that usually cost about five dollars per hundred. Furthermore the scoring of such tests requires from about two minutes for an Otis Self-Administering Test to about thirty minutes for a Thorndike Intelligence Examination for high school graduates. Experiments show too that the scoring of mental tests involves considerable error. Dearborn, for example, found that 73 per cent of 530 tests were incorrectly scored the first time.

The problems, therefore, under consideration in this study are: (1) Is it possible to give standardized intelligence tests by an answer-sheet method and thereby lessen the scoring errors? (2) Can the time required for scoring mental tests be reduced so that the results will be almost immediately available? (3) Can the cost of tests and of scoring be reduced appreciably? (4) How *reliable* are intelligence tests when given by an answer-sheet method? (5) Are mental tests *valid* when given by an answer-sheet method?

PROCEDURE

Several groups of students in Eastern Kentucky State Teachers College and grades four to twelve of the Training School were used in the study. They were given intelligence tests by both the regular and the answer-sheet methods. An alternation of forms and methods was applied in order to equalize whatever gains may come from practice.

* Preliminary report read at the meeting of the Southern Society for Philosophy and Psychology, Nashville, Tennessee, 1935.

The tests used in the Training School were the Henmon-Nelson Tests of Mental Ability and the Haggerty Group Intelligence Test. The tests given to one or more of the college groups were the Ohio State University Psychological Test, the Henmon-Nelson, the Otis Self-Administering, the Carnegie Mental Ability Tests, the Kentucky Classification Test and the Thurstone and Thurstone (American Council) Test. The Teachers College Personnel English Test (Reading, English, Literature) and the Elementary Test (Geography, Civics and History, General Science, Arithmetic) of the same series were given to the college groups. The American Council and the Teachers College Personnel Tests were given according to manual directions only and were for determining the validity of certain tests which were given by both methods.

When tests were given by the regular or consumption method, the manual directions were followed. When the tests were given by the answer-sheet method, it was necessary to slightly modify the manual instructions. An answer-sheet was used with big numbers corresponding to question numbers followed by circles with little answer choice numbers 1 2 3 4 5. Students were instructed to make every mark on the answer-sheet. They were told to read a given question, to find the big number on the answer sheet which was the same as the question number and the little number which was the same as the number of the correct answer and to mark an X on this choice number. For example, practice exercise 1 for the Henmon-Nelson test is: "Boys like to play: 1 ball, 2 state, 3 dust, 4 never, 5 blue. The students therefore were asked to make an X on the small one in the first circle after the large 1 on the answer sheet to indicate the correct answer to the question. The third exercise is: "3, 6, 9, 12, —, —. What two numbers should come next? (1) 24 and 36, (2) 13 and 14, (3) 15 and 18, (4) 9 and 6, (5) 15 and 16. The answer is 15 and 18, so the students should have put an X in circle three after the correct question number on the answer sheet. After the students had been given practice exercises they were

instructed to indicate their answers to the regular test in the same way. Only necessary alterations were made in the wording of the manuals and these changes were consistently followed thereafter. No changes were made in the tests with the exception of the Otis Self-Administering Tests. For the answer-sheet method certain questions in this test were changed to multiple-choice questions.

The answer-sheets were put in perforated answer cards and punched by the individuals taking the test. Then the examination scores were weighed by a *testometer*. It, as shown in Figure 1, consists of a scale (A) that has ¼ ounce graduations (B) on the face and an indicator (C). The platform of the scale is lettered (D). The scale sets on the testometer's base (1). At the right, vertical to the base (1), is a rod and pipe bearing (2). Attached to this pipe (2) is an open frame (6) —similar to a picture frame without a glass—with a side rail at the back and right to make easy the positioning of an Answer Card which consists of two perforated cardboards (4) and a thin sheet of paper (5). Above the answer-card frame (6) is a box-like weight elevator (7). It is nearly an inch thick, and in length and breadth about the size of the answer-card. In it are 500 holes exactly corresponding to the holes in the answer-card. In setting the apparatus for a particular test the operator inserts in each hole that corresponds with a correct answer, a slender weight (8) with a head that is larger than the hole in the elevator (7). The weights pend perpendicular to the elevator (7) and are acted on by gravity. They are light enough so that if the paper (6) has not been punched in a given answer hole, the paper will hold up that weight (see 8′ in the side view of the testometer). The weights however that are over correct answers—punched answers—(see 8 of the side view) stand on the scale platter and are counted by the scale.*

* If interested in other details see: "A New Way to Score Tests," *Educational Method*, 1934; "A New Device that Scores Tests," *J. Educ. Psychol.*, 1935, 1, 73–77; "Student Papers are Graded by Weighing Answers," *Popular Mechanics*, 1935, 64, 338.

In scoring intelligence tests by weight, the operator simply placed a student's card (4) on the frame (6) and lowered the elevator (7) with the lever (3). At every place where a correct hole has been punched a weight fell to and stood on the scale platter (D) which was slightly below the answer-card; but in all other cases the weights were held up (8 and 8′ respectively of the side view). Since each weight was $\frac{1}{4}$ ounce, if the indicator (C) read 20 ounces, there were 4×20 or 80 correct answers; likewise if the reading was 25 ounces there were 100 correct answers. In other words, the test score was the number of ounces times four. The total number of correct responses (ounces $\times 4$) were read directly from the scale. The tests were rescored then and a record was made of the time and errors involved in the determinations of the number of correct answers by weight. These records were compared with similar data obtained by giving and scoring the tests in the regular way.

The results indicate more definitely the data obtained and the statistical treatment of the data.

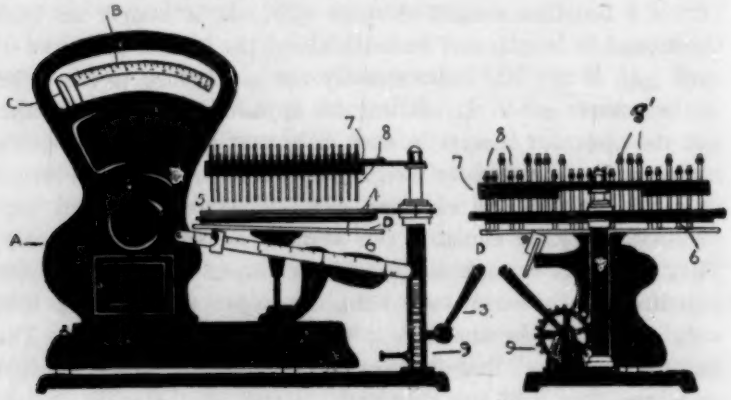

FIG. 1. Testometer.

RESULTS

Table I shows the scoring time and the range and frequency of errors per 100 tests when scored by the regular and the testometer methods.

The data show that the Henmon-Nelson tests were scored about eleven times faster with the testometer than by the regular method. Likewise the Kentucky Classification Tests were scored seventeen times faster. An average for all the tests indicates they were scored about twelve times faster when the testometer was used. In other words as many tests were scored in five minutes with the testometer as were regularly scored in an hour by trained scorers or about 92 per cent of the time ordinarily spent in scoring these intelligence tests was saved. Furthermore it is evident that from about 75 to 300 tests were scored per hour by means of the testometer. Thus making it possible to determine the results for a large group in a short time.

TABLE I

Rate and Accuracy of Scoring Intelligence Tests[1]

TEST	SCORING TIME PER TEST (SECONDS)		SIZE AND NUMBER OF ERRORS PER 100 TESTS						
	R*	T**	R	T	R	T	R	T	
		(Size)	0	0	1	1	2–7	2–7	8
Henmon-Nelson	67	11 (No.)	71	100	19		10		8
Carnegie	369	48	65	99	21	1	14		
Otis	149	12	88	100	10		2		
Ohio State	138	36	73	98	15	1	9	1	3
Kentucky	180	11	81	99	12		7		

* Regular. ** Testometer.

[1] Much of the statistical work in this study was done by Naomi Kalb and Evelyn Reynolds.

It is also evident from Table I that 71 Henmon-Nelson Tests were correctly scored by the regular procedure versus no errors by the testometer. Similar data for the other intelligence tests show that the testometer is from 13 to 32 times more accurate than the manual methods of grading tests.

Table II indicates that the answer-sheet method of administering tests largely solves the cost problem.

TABLE II

Cost of Testing 500 Subjects

TEST	METHOD	TEST BOOKS	ANSWER SHEETS	LABOR @ 40c PER HOUR	TOTAL
Henmon-Nelson	Regular	$15.00		$ 3.61	$18.61
	Testometer	1.50	$ 5.00	.65	7.15
Ohio State F. 17	Regular	4.00	22.50	20.00*	46.50
	Testometer	4.00	15.00	2.00	21.00
Otis	Regular	16.00		8.28	24.28
	Testometer	1.60	5.00	.65	7.30
Carnegie	Regular	3.00	15.00	20.00	38.00
	Testometer	3.00	20.00	2.64	25.64
Kentucky	Regular	15.00		10.00	25.00
	Testometer	1.50	5.00	.65	7.15

* Cost of Ohio State service.

TABLE III

Coefficients of Reliability

TEST	GRADE							
	5		7		8		COLLEGE N (303)	
	R*	T**	R	T	R	T	R	T
Henmon-Nelson								
R*	.66		.74		.49		.64	
T**	.53	.89	.73	.88	.83	.91	.87	.63
Otis								
R							.81	
T							.69	.76
Ohio State								
R							.89	
T							.84	.91
Kentucky Classification								
R							.82	
T							.93	.76

* Regular.

** Testometer.

TABLE IV

Validity of the Regular and Testometer Scores Made on Intelligence Tests

TEST	HENMON-NELSON								COLL.		OTIS COLL.		OHIO STATE		KY. C. COLL.	
GROUP	4		5		7		8									
	R	T	R	T	R	T	R	T	R	T	R	T	R	T	R	T
Th. & Th.									.76	.73			.73	.77	.76	.74
American C. (Int. 6 mos.)											.81	.69				
Haggerty (1 yr.)	.62	.51	.76	.69	.74	.70	.78	.73								
Otis									.69	.80						
										.74						
T. Coll. Personnel																
Reading									.67	.67	.68	.70				
Eng.									.76	.70	.71	.55				
Elem. Subj. (6 mos.)									.56	.71	.72	.41				

To illustrate, if we accept the assumption by Ross and Gard that fifty copies of any test may be used to test 500 students by the answer-sheet method, whereas, the consumption method necessitates buying 500 test booklets, and then figure testometer answer-sheets at one cent each and scoring labor at forty cents per hour, we find the cost of testing 500 subjects by the Henmon-Nelson carbon method is about $18.61 compared with $7.15 for the testometer method. The respective costs for the Ohio State Test, Form 17, are $46.50 and $21.00. In other words the savings the first year for the various tests by the testometer method range from 32% to 71%. Since the test blanks by this method become in a sense "permanent equipment" it is possible to use them for a second testing program and make the cost contrast more pronounced.

Table III gives coefficients of reliability between scores secured by the regular and by modified methods of administering alternate forms of four tests. From an examination of 234 coefficients of consistency it is evident that the range is from .53 to .87—as indicated by the given *r's*—and that the answer-sheet method is practically as reliable as the regular method.

Table IV indicates the validity of the test scores from both methods as revealed by correlation with other tests.

CONCLUSIONS

The data presented in this study seem, in a measure, to justify these conclusions.

(1) Intelligence tests can be scored about twelve times faster by weight than by manual methods.

(2) Mental test scores obtained by weight are from 13 to 32 times more accurate than those obtained by other methods of scoring.

(3) The cost of test-intelligence by weight is from 32 to 71 per cent less than by other rapid methods.

(4) The method of determining intelligence scores by weight is about as reliable as the regular methods. The differences are not statistically reliable.

(5) Intelligence scores obtained by weight seem to be about as valid, when several criteria are used, as those scored by the common methods.

THE ORCHESTRAL TYPE PREFERENCES OF STUDENTS

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THERE is considerable knowledge extant concerning the relationship that obtains between scholastic aptitude and various aspects of musical ability. It is known, for example, that an individual may attain great facility in the mechanical (motor) phases of instrumental performance even though possessed of a relatively mediocre abstract intelligence. On the other hand it is probably true that the creative and distinctly artistic aspects of musical art require a concomitantly high degree of intellectual acumen. In brief, when discussing the correlation between so-called general intelligence (scholastic aptitude) and musical ability one must be specific as to just what aspect of musical production or appreciation is under examination.

In this study an attempt has been made to discover, in as objective a manner as possible, just what types of orchestral selections students of known intelligence prefer when afforded the opportunity of listening to a number of well defined types under relatively controlled conditions. This is then an investigation dealing with the appreciation of orchestral music in the sense of unanalysed but definitely recognized satisfying reactions to a variety of stimuli comparable in mechanical and artistic quality of production but varying in type or form, and emanating from a carefully trained college orchestra.

In the course of studying this question of musical preferences it occurred to the writer that reasonably valid data could be secured by arranging for a controlled concert in which various types of orchestral numbers would be illustrated by selections known to represent the types in question. Thus the factor of quality of skill in performance could be held constant.

Other lesser factors could be equalized since all selections would be played during the same concert, under the same conductor, and by the same players. Thus the factor of type of composition would constitute the one important variable and would lead to an objective determination of type preferences without the mitigating influence of uncontrolled factors.

Accordingly the writer who previous to his activities in the field of education had spent several years as a conductor of bands and orchestras on both high school and college levels, planned a public orchestra concert developed in harmony with the conditions mentioned above. He taught the orchestra (twenty-five select pieces with the customary instrumentation) personally for three and one-half months. By that time it was evident that the players, practically all of whom were college students and none of whom were professionals, were about as well prepared as it was possible for them to be in view of their previous degree of skill on the various instruments. Incidentally such principles of motivation and effective motor learning as are usually developed in educational psychology courses were utilized throughout the training period. In the end all the orchestral types attempted were performed with practically the same degree of technical and interpretative excellence. At least that was the conductor's honest appraisal.

Several days before the concert, during assembly, four hundred college students and about seventy-five high school pupils were informed about the contemplated experiment and invited to attend the performance. (This project was carried out in a private college maintaining a preparatory department). They were told to make definite note of their first, second, and third choices which, incidentally, would be called for at the next assembly (two days later) on a check list.

Actually, about two hundred individuals, most of whom were college students, attended the concert and subsequently made available the desired data as requested. For comparative purposes, students who thought they knew the different types of orchestral music and who were willing to select first, second,

and third choices, without a hearing, were asked to fill out the check sheet even though they had *not attended* the experimental concert. It was thus possible to determine the extent to which college students' orchestral perferences are influenced by listening to samples of various types.

With a view to ruling out *a priori* choices based upon previously selected preferences an effort was made to select orchestral numbers of recognized standard quality and type but which are not well known to the general college populace. Thus the student was literally required to make a critical comparison before arriving at a definite decision. At least, he had to give all the numbers an unbiased hearing in order to evaluate the degree of emotional satisfaction (appreciation) excited by each. In this way the factor of specific antecedent conditioning was reasonably well controlled.

For the benefit of those interested in securing a more specific verbal picture of the orchestra music types and the samples utilized in the concert under examination, the actual program is presented here:

1. Military March ..... "Spirit of Independence" ..... Holzmann
2. Concert March ..... "D'Annunzio" ..... Boccalari
3. Standard Overture ... "Hungarian Lustspiel" ..... Keler-Bela
4. Concert Waltz ... "Les Patineurs" (The Skaters) ... Waldteufel
5. Descriptive Music ..... "Whispering Flowers" ..... Blon
6. Semi-Symphony ..... "Ballet Egyptian" ..... Luigini
7. Concert Dance (Mazurka) ..... "La Zingana" ..... Bohm
8. Chamber Music ..... "Adoration" ..... Borowski
9. Religious Music (Not illustrated) .....

It will thus be noticed that eight well defined types of orchestral compositions were illustrated. As previously mentioned all were performed under comparable conditions with approximately the same degree of technical skill and artistic interpretation.

While it would have been somewhat out of place in the concert and was therefore not illustrated, religious music was included in the check list in order to learn its relative importance in the musical life of students. Obviously the type is well known to all, especially in its hymnal form. Nevertheless, due

to its specialized nature and religious associations, it may not be comparable in an evaluation of this kind. The reader is entitled to his own judgment in the matter.

RANGE OF CHOICES FOR ALL STUDENTS

While it is not possible to display all the data disclosed in the course of the investigation in the present abridged report, it should be mentioned that distributions of IQ's for both college and high school students who did and who did not attend the concert in question were essentially symmetrical indicating that we are working with a group of individuals who are probably representative of college and high school students in general in both groups.

In connection with the determination of musical preferences, the various student groups were subdivided into classifications representing first, men and women; second, normal and superior IQ's; third, upper and lower college divisions and high school level; and fourth, liberal arts, professional, and vocational curricula. General findings for these classifications are indicated in the summary.

A résumé of the data suggests an inquiry into just how many votes each type, illustrated in the concert (including religious music), received as one of the three preferences. Complete figures for absolute numbers and for percentages in each case, relating to both students who attended and who did not attend the concert, are shown in Table I.

From the table we can discern the relative popularity of the nine orchestral types with which this study is concerned. As far as the first choice is concerned the well known military march ranks highest and the concert waltz third. On the other hand, we see that the semi-symphony occupies second rank. This order of preference is indicative of a reasonably cultured musical appreciation in the group under examination. They may prefer the dynamic tempo of the march and the flowing rhythm of the waltz but they also enjoy the majestic symphonic motif and the vigorous variety of the overture.

In the realm of second and third choices, the march and the waltz again rank highest but here the descriptive type runs third. Again the overture and the semi-symphony rank high but this time fourth in preference. The rank of all the types may be located in the table.

Obviously, one can only speculate as to the etiology of the musical choices disclosed in the present study. We know that early life situations and continued environmental pressures are responsible for organism reactions of this sort. An individual's ultimate aesthetic preferences are but the end product of the cultures and mores to which he has been subjected in the sequence of personal experience. Such backgrounds include socio-economic status of the home, musical activities of the parents, the presence of a radio in the home, opportunities for studying music, variety of conditioning experiences encountered, etc.

The writer endeavored to secure statements from the subjects in question touching on the specific reasons for their preference. However, the replies presented by students were for the most part entirely too indefinite to be of value in appraising either the genesis or the emotional justification of their choices. It would have been possible, of course, to place a list of plausible reasons on the students' check list and subsequently request them to select the ones deemed germane in any given case. In this instance such a procedure would be tantamount to projecting the examiner's hypothetical reactions into the mouth of the student.

SUMMARY

In this study an attempt has been made to ascertain the orchestral type preferences of college and high school students through the medium of a relatively controlled orchestra concert. Approximately two hundred students (college and high school) attended the recital and subsequently responded to a check list. A group of one hundred other comparable students who did *not attend* the concert acted as a control and also filled out the check list. Not all of these individuals returned complete data.

TABLE I

Number and Per Cent of all Individuals in the Study who Voted for Each Orchestral Type as First, Secon

ORCHESTRAL NUMBERS (TYPES)	ALL STUDENTS—COLLEGE AND HIGH SCHOOL																		
	First Choice									Second Choice									A
	All Students			Attended			Not Attend			All Students			Attended			Not Attend			
	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.
Military March	108	38	1	69	35	1	39	43	1	59	21	2	43	22	2	16	19	2	39
Semi-Symphony	42	15	2	34	17	2	8	9	4.5	29	11	4	23	12	3.5	6	7	7.5	21
Concert Waltz	33	11	3	25	13	3	8	9	4.5	66	24	1	47	25	1	19	22	1	53
Standard Overture	32	11	4	23	11	4	9	10	3	25	9	6	15	8	6	10	12	3.5	30
Descriptive Piece	23	8	5	12	6	6	11	12	2	33	12	3	23	12	3.5	10	12	3.5	33
Chamber Music	20	7	6	17	8	5	3	3	8	26	9	5	21	11	5	5	6	9	20
Religious Music	12	4	7	7	4	7	5	5	7	11	4	9	4	2	9	7	8	5.5	26
Concert March	9	3	8	3	2	9	6	7	6	13	5	8	6	3	8	7	8	5.5	22
Concert Dance	7	2	9	5	3	8	2	2	9	14	5	7	8	4	7	6	7	7.5	18
Totals	236	100	–	195	100	–	91	100	–	276	100	–	190	100	–	86	100	—	262

I

or Each Orchestral Type as First, Second, and Third Choice

OLLEGE AND HIGH SCHOOL

ond Choice						Third Choice								
Attended			Not Attend			All Students			Attended			Not Attend		
	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank
	22	2	16	19	2	39	14	2	27	15	2	12	14	3
	12	3.5	6	7	7.5	21	8	7	16	8	6	5	6	7.5
	25	1	19	22	1	53	20	1	36	20	1	17	20	1
	8	6	10	12	3.5	30	11	4	22	12	3.5	8	9	6
	12	3.5	10	12	3.5	33	12	3	22	12	3.5	3	4	9
	11	5	5	6	9	20	7	8	17	9	5	11	13	4
	2	9	7	8	5.5	26	9	5	13	7	8	13	16	2
	3	8	7	8	5.5	22	8	6	13	7	8	9	11	5
	4	7	6	7	7.5	18	6	9	13	7	8	5	6	7.5
	100	–	86	100	—	262	100	–	179	100	–	83	100	—

Intelligence score distributions of both college and high school students who did and who did not attend the experimental concert indicate that we are working with symmetrical samplings as far as the intellectual capacity of the subjects is concerned. This is especially true of the larger college distributions. Reliability indices were worked out for all distributions. (Not shown in this condensed report).

In all college and high school distributions the military march and concert waltz types of orchestral selections turned out to be great favorites. This was true regardless of IQ status, college grade, and type of curriculum pursued. Other types such as the semi-symphony and the standard overture were frequently chosen by certain of the student groups.

The choices of men and women tended to be identical in a general way. In a more detailed analysis it appeared that the women were more variable than the men in their preferences but that they were relatively less emphatic in expressing their favorite types (smaller percentages). This was especially true in the case of college women who did not attend the concert. In view of the finding that the orchestral type preferences of students who did not attend the recital (control) were practically identical with the choices of those who attended (experimental) and thus made direct contact with the type samples it seems that the orchestral type preferences of students on both collegiate and high school levels are fairly well established before they reach the educational status in question. The mere experience of listening to specific samples does not apparently influence their ultimate choices within the range of types illustrated.

It may be that since only one sample of each type was presented, we are not justified in assuming trustworthiness for the results secured. That is to say, it is impossible to know how consistent the choices might have been if other musical selections had been played. However, it is a noteworthy fact that students in the control group who did not hear the samples performed tended to concur with the experimental individuals in the matter of type choices. Perhaps variation in the selection

of specific samples is not important in determining ultimate type preferences.

On the other hand it would be well to check the reliability of results attained through further investigation in which a number of different representative samples were utilized for each type and in which the *order of presentation* was varied for purposes of determining the influence of this factor.

Judging from results accruing in this study (not shown in this abridged report) the factor of orchestral type preference is largely independent of such additional factors as intellectual status, grade in college, and type of curriculum chosen. Frequent deviations from this general observation were in evidence but in no case did they appear consistent or dominant. They may be the result of chance or selective factors.

It is, of course, clear that this study deals with a specific school situation (private parochial college) and therefore represents a somewhat specialized distribution of students. Thus the findings may or may not be representative of liberal arts colleges as a class. Selective home and school factors may have brought about a non-representative sampling. Interpretations should be restricted accordingly.

Students were not able to advance valid reasons for their musical preferences. This is not surprising in view of the artistic nature of aesthetic reactions. The real reasons probably lie buried as it were in a complex sequence of intimate personal experience dating back to early childhood. Unknown conditioning factors have no doubt played a prominent rôle in the ultimate musical type preferences.

There is evidently no appreciable correlation between intelligence quotients and musical preferences of the orchestral varieties presented. While this interpretation does not grow out of an application of the partial correlation technique in which other influential factors are statistically controlled, it appears warranted in the light of data presented in the present study. Some fluctuations in type preferences appeared occasionally between normal and superior IQ levels but they were certainly insignificant and non-constant.

BLOOD TYPE AS RELATED TO INTELLIGENCE, EMOTIONS, AND PERSONALITY

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DOES blood type influence psychological traits? A demonstration of such influence should make available to the clinical psychologist still another technique for the evaluation of individual differences. With such a possibility in mind, the following experimental study was undertaken at the San Diego State Teachers College.

The group studied consisted of 103 college students selected at random. Blood samples were typed and certain psychological factors measured. The following measures were applied: 1. Intelligence (Thorndike Measures of Intelligence; Thurstone Intelligence Test); 2. Personality (Neymann-Kolstead Measures of Extroversion-Introversion); and 3. Emotions and Idiosyncrasies (Pressey X–O). The Thorndike and Thurstone tests were selected as well-standardized measures of intelligence applicable to adults of college level. The Neymann-Kolstead and Pressey X–O tests are recognized and comprehensive measures of personality and emotions and include fears, disgusts, sex concerns, self-feeling, paranoia, neurotic tendencies, self-consciousness, melancholia, hypochondriacal tendencies, and total affectivity.

The scores of individual subjects were tabulated according to blood type[1] and statistical measures applied. Of the 103 subjects, 55 (53.4%) were of Group O; 45 (43.6%) were of Group A, and only three (2.9%) were of Group B. No subjects were found to belong to Group AB. Because of the small number of cases of Group B, correlations were made only on groups O and A.

[1] Landsteiner O (Jansky I, Moss 4). Landsteiner A (Jansky II, Moss 2). Landsteiner B (Jansky III, Moss 3). Landsteiner AB (Jansky IV, Moss 1).

The following conclusions were reached:

1. It was found that there were only 6,064 chances in 10,000, or six in ten, that there is a true difference in intelligence between the two blood types O and A. It was therefore concluded that blood type has no relation to intelligence.

2. There were found to be only 6,406 chances in 10,000, or six chances in ten, that there is a true difference in "total affectivity" between the types O and A.

3. With respect to "total idiosyncrasies" there were 5,218 chances in 10,000, or five in ten chances, that there existed a true difference between the two types A and O.

4. It was found that there were 5,372 chances in 10,000, or five in ten, that there was a true difference between blood types O and A in personality, as measured by the Neymann-Kolstead Test.

Assuming that the psychological measures applied represent a fair inventory of intelligence, emotions, idiosyncrasies and personality, this study seems to indicate that a relationship between these factors and the blood groups A and O does not exist. Inasmuch as cases of Group B were excluded as negligible in number, and Group AB was found to be absent, there is no evidence as to a relationship, or lack of it, for these blood groups. However, it seems reasonable to suppose that since no relationship was found for types A and O, none would exist for the remaining groups, particularly since blood type O contains both antigens alpha and beta and blood type A contains only the antigen beta.

These findings are in direct disagreement with those published by Takeji Furukawa[2] who reports definite relationship between blood types and "temperament." He constructed the following questionnaire as a measuring device for the temperaments of his subjects, who numbered a total of 1,245 persons from the ages of one to seventy, taken from all walks of life.

[2] Faculty member, Tokyo Girls' Higher Normal School, Tokyo, Japan.

QUESTIONNAIRE (Furukawa)

Directions: Read the following and place a circle in the group in which you think you belong. Should there be any other items in the other group which can be applied to your case place a circle before that item.

Group X	*Group Y*
1. Those who do not brood over things.	1. Those who are quiet.
2. Those who easily abandon hope.	2. Those who are constantly anticipating fear.
3. Those who do not hesitate to appear before people.	3. Those who do not easily abandon hope.
4. Those who are not of a retiring nature.	4. Those who are of a retiring nature.
5. Those who do not hesitate to come to a decision.	5. Those who are bewildered in making decisions.
6. Those who are active.	6. Those who are timid.
7. Those who mingle with others frequently.	7. Those who are sensitive.
8. Those who will not listen to others.	8. Those who are hesitant to appear before people.
9. Those who are not influenced by others.	9. Those who are easily moved by external stimulation.
10. Those who do not change their course of action.	10. Those who do not assert themselves.
11. Those who are tenacious.	11. Those who are not tenacious.

"Summarizing in brief the various persons of all blood types and their mutual relationship to the individual temperaments," Mr. Furukawa concludes, "I find the following:

1. Persons of Type O and persons of Type B have similar mannerisms but the strength and weakness of their emotions and will are directly opposite.

2. Persons in Type O and persons in Type A differ entirely in mannerisms, emotions, and will.

3. Persons in Type A and persons in Type B have opposite mannerisms, but have similar emotional tendencies.

4. Persons in Type O, Type A (O), and Type B (O) have similar points in their will.

5. Persons in Type AB have opposite mannerisms with that of the two other types A and B and because of their mixed qualities it is difficult to decide the temperaments externally. However, both these types have a common emotional tendency."

CRITICAL SUMMARY

In reviewing the work of Dr. Furukawa, the large number of cases and his thoroughness in studying the various ramifications of the problem make his conclusions worthy of serious consideration. However, two important objections should be answered if the work is to be considered scientifically acceptable. In the first place, we were unable to find data concerning the nature of the statistical measures used in the correlations and in calculating such important factors as standard deviation, reliability, and probable error. However, were this the only objection, credence might still be lent to his conclusions, for the demonstration of any relationship at all would be worth consideration. A more significant objection can be raised to the nature of his measuring device or questionnaire used for the estimation of the so-called temperamental traits. It is questionable whether such a device measures anything at all, except possibly wishful thinking. No standardizations are quoted, and no comparisons made with more recognizedly accurate measures. The statements concerning a relationship between intelligence and blood type, for example, are based upon his own subjective discriminations, rather than upon results secured by standardized tests.

The high percentages of uniformity which Dr. Furukawa finds, averaging from 80 to 90 per cent in all cases, or 80 to 90 chances out of a hundred that blood type influences "temperament," is certainly indicative of something. Our most careful analyses have failed to show what that something is. Although our cases provided us with sufficient numbers of but two of

the blood types, A and O, the fact that those types of Dr. Furukawa which showed the most strikingly different personality characteristics were the same types A and O makes us feel that the two studies are sufficiently comparable, and that the two sets of conclusions can be considered entirely at variance. At present we feel that blood type does not influence intelligence, emotions, idiosyncrasies, or personality.

ACKNOWLEDGMENTS

The writer wishes to acknowledge the assistance of Dr. Harry C. Steinmetz, Department of Psychology, San Diego State Teachers' College, in the conception of this study, and of Mr. George Hartley in the clinical procedures.

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NEWS AND NOTES

The Twenty-second International Training Course for Teachers will be given by Dr. Maria Montessori in London from January 25 to June 12, 1937, under the auspices of the International Montessori Association. In this course Dr. Montessori will for the first time deal with the four plans of education, as she conceives them throughout the span of human life. The first epoch is that of the child's constructing his personality by actively acquiring independence in the material and spiritual activities of life in his own environment. The second epoch is that of puberty, in which the child becomes interested in social life. The third epoch is a period of study more resembling that of university life, which is followed by a special preparation for the maturation of a moral attitude to guide his activities during the rest of his life. The fourth epoch is the life of adult man in activity to exploit the natural and cultural resources of his environment towards a more enlightened and general welfare. In addition to the lectures given personally by Dr. Montessori, the Course consists of demonstration classes with the Montessori apparatus and observation at certain Montessori schools. Further particulars concerning the Course may be obtained by writing to the International Montessori Association, 1 Hampstead Hill Gardens, London, N. W. 3, England.

The XI International Congress of Psychology which was to have been held in Madrid in 1936 will meet at Paris from July 25 to 31, 1937, under the honorary presidency of Professor Pierre Janet. The chairman of the organization committee is Henri Pieron and the general secretary is I. Meyerson. Headquarters of the Congress will be at the Psychological Laboratory of the Sorbonne.

The Midwestern Psychological Association will hold its twelfth annual meeting at the University of Illinois, Urbana, Illinois, on Friday and Saturday, April 23 and 24, 1937, under the presidency of Dr. Harvey A. Carr. The Midwestern Psychological Association is an open organization of all psychologists who wish to join. The only requirements for membership are that the candidate be a member or associate member of the American Psychological Association. A special invitation is extended to qualified graduate students in the universities in the midwestern area to become members of the Association. Applications should be in the hands of the Secretary, Arthur G. Bills, Department of Psychology, University of Chicago, Chicago, Illinois, by March 1.

Members who are expecting to present papers are urged to prepare abstracts and have them in the hands of the Secretary not later than February 10, 1937.

A tentative announcement has come to this JOURNAL from The Principia Press, Bloomington, Indiana, of a plan to publish a cooperative

psychological journal, *The Psychological Record*. The management of the journal will be placed in the hands of a competent board of editors which will shape its policies. Manuscripts in the theoretical, experimental, social, child, clinical, and abnormal fields will be considered and published immediately if acceptable. One volume of approximately 500 pages will be published per year. The annual subscription will be $4.00. Further information may be obtained from The Principia Press, Bloomington, Indiana.

The National Home Library Foundation, Dupont Circle Building, Washington, D. C., recently announced its plans for the distribution of a million copies of new books of special interest to educators, available at 25 cents per volume. Distribution of these books will begin immediately to all sections of the country. Titles have been approved by an advisory board of sixty-six of the most distinguished names in the arts and sciences, including James Truslow Adams, Eugene O'Neill, Louis Untermeyer, William Allen White, Dorothy Canfield Fisher and Dr. Willis A. Sutton. Review copies will be sent on request.

Dr. Arthur A. Otis has prepared a new test, The Alpha Form of the Otis Quick-Scoring Mental Ability Tests, designed for use in grades one through four where language ability is not yet fully developed. The classification of pupils in the primary grades presents a real problem to teachers. A test that will accurately, quickly and impersonally determine the individual differences of young children will eliminate unnecessary repetition for some and discouragement for others. The test is easy to administer, has but one set of directions and one time limit (20 minutes). The World Book Company is the publisher.

Dr. David Segel, U. S. Office of Education Specialist in Tests and Measurements, has recently made a nation-wide study of elementary school graduating examinations. "Is there any uniformity in construction and administration of elementary school graduation examinations in the different states? Are these tests an aid or a hindrance to the child's progress? Are tests used merely to measure accumulated facts or are they attempts to measure the growth of the child in terms of his mental capacities?"

It was found that 21 states administer state-wide examinations to pupils at the end of their elementary school period. In some cases the state department of education assumes only the preparation of the examination. In other cases it is concerned also with the procedure in the examination period and with the analysis of results. The prospective high school student is usually tested in arithmetic, reading, spelling, English, history, civics, geography, physiology, and hygiene. For the most part, objective tests are given with an occasional essay type of answer required.

Recommendations were as follows:

1. That examinations which are used mainly to determine eligibility for graduation from the elementary school be discontinued.

2. That there should be flexibility in the testing program of each state.

3. That where a need for better pupil guidance, knowledge of individual differences or a check upon efficiency of the curriculum is felt in the state, a testing program should be established.

4. That the teacher, under the direction of the county superintendent and the state department of education, should give and score examinations. The findings should be made available to the county superintendent for use in compiling average scores by grades and in the supervision of instruction.

An Office of Education circular, "College Receipts and Expenditures, 1935–36," prepared by Henry G. Badger and Dr. Frederick J. Kelly, reveals that more than 300 colleges and universities throughout the United States found that the fiscal year 1935–36 was financially a better one for them than 1933–34. Increases have ranged from 2.9 per cent in expenditure of 122 privately-controlled universities, colleges and professional schools attended by white persons, to 26.2 per cent in receipts of two negro teachers colleges and normal schools. The average increases for all institutions reporting are 12.6 per cent in receipts, including those for capital outlay, and 5.8 per cent in expenditures for instructional and general purposes only.

Preliminary proposals coordinating all applied psychological interests in a national society will appear in the January–February issue (Volume I, No. 1) of the *Journal of Consulting Psychology*. These proposals, which are published now for discussion purposes, have been prepared by the National Committee for Federation and Affiliation of Applied Psychology, consisting of Robert G. Bernreuter (Penn. State), Francis N. Maxfield (Ohio State), Donald G. Paterson (Minnesota), Martin L. Reymert (Mooseheart), and Douglas Fryer, chairman (N.Y.U.), which is a committee appointed at the Dartmouth meeting of applied psychologists last September. This committee is charged with the task of preparing proposals for a national society of applied psychology, to be formed of specialists in clinics and institutions, courts, education, employment and personnel, guidance, industry, market research, etc., and to present these proposals for action at a meeting of applied psychologists planned to be held in connection with the A.P.A. meetings. The final report of the National Committee will be published in the June issue of this Journal (Vol. 21, No. 3). The National Committee requests that all persons interested in the proposed national organization of applied psychology discuss these proposals as published in the *Journal of Consulting Psychology* and report any suggestions directly to members of the National Committee or to the Editor of this Journal.

BOOK REVIEWS

HUNT, THELMA. *Measurement in Psychology.* Prentice Hall, Inc., New York, 1936. xx + 471 pp.

The whole field of psychological testing, rather than mental testing or some other restricted field of measurement, is the subject matter of this text. The book is divided into seven parts, the names of which will give a good idea of the material covered. They are: the place of measurement in psychology, measurement of intellectual qualities, measurement of aptitudes, measurement of achievement, measurement in industrial and personnel fields, measurement of the more general traits of personality, and physiological measurements in psychology.

It is obviously out of the question for a writer to deal at great length with any one subject when so many are included. The content of most of the divisions, and in some cases even individual chapters, has been made the basis of textbooks by other writers. Dr. Hunt has merely attempted to give a general survey of the whole field of testing. The nature of the task thus imposes a very definite limitation, *viz.*, severe brevity upon the writer's treatment of any one field of testing. It seems to this reviewer that, by judicious selection and by clear and concise presentation, the writer has all but surmounted the limitation imposed by her task. To be sure, significant tests are left unmentioned, especially in the more highly developed fields such as mental testing. Yet the student upon finishing the book will have gained a clear picture of the methods, uses, and results of testing in a number of different fields, with illustrative material drawn from a few of the better known tests in the respective fields. The book abounds in samples of test items, reproduced pages of tests, and in some instances entire tests. A reading knowledge of the fundamental concepts of statistics is all that is necessary in the way of technical equipment for a ready understanding of the book. This the writer assumes, and more than this is not required.

The book is well suited for use as a supplement to more specialized courses in testing, and as a text in courses dealing with testing in a more general way. Indeed, one wonders if having such a text available may not tempt a number of psychology departments to offer courses in general psychological measurement. Written as a textbook for college use and not in the popular vein, the book is nevertheless one which any well informed reader with more than a casual interest in the subject will find both interesting and highly informative.

AMOS C. ANDERSON,
Ohio University

CUFF, NOEL B. *Educational Psychology.* Standard Press Co., Louisville, Kentucky.

This volume is unique in that the choice of chapter headings is a result of a check-list of major topics in eighteen recent texts in educational psychology which the author submitted to teachers of the subject in institutions accredited by the American Association of Teachers Colleges. This, to begin with, makes the book more usable as a text in general educational psychology from the standpoint of topics presented. It is evident also that Dr. Cuff had the student in mind because the context of the book is simple yet thorough and replete with striking illustrations which clinch the facts, implications, and points of view. The volume seems designed primarily for a first course in the subject with the assumption that few students are majoring in the subject. The major principles of general psychology are of course used as a basis for the discussion of topics throughout together with practical material from classroom experiences of the author. It seems that the final chapter (Socialization and Guidance) has met an urgent need for the present and will stimulate both student and teacher to more serious consideration of the ultimate goal of all education.

At the close of each chapter are questions and problems for class discussion and also numerous objective test items which students may use to check their knowledge of the topics. Each chapter carries a selected bibliography of recent and standard references and also a list which students in educational psychology have listed as helpful. While the contribution lacks detail on some topics it will be considered by most readers as definitely more than just another book in Educational Psychology.

JESS H. EDDS,
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STARCH, DANIEL, STANTON, HAZEL M., KOERTH, WILHELMINE. *Controlling Human Behavior.* New York: The Macmillan Co., 1936. Pp. xiv + 638. $2.90.

"This book," according to the authors, "aims to bring together psychology and living. . . . [It] endeavors to consider more fully the vital problems of human behavior than the average introductory text. It aims to deal with situations that matter to us, with basic problems around which the world of human affairs revolves. It is designed to deal with problems connected with making a living, with establishing and maintaining family life, with behavior in business operations, with influencing people in the mass, and finally with the art of effective, satisfying living.

"Most of the waking life of the average person is devoted to making a living and maintaining home and family. Yet, our textbooks hardly indicate that there are such problems, or that they constitute nearly all there is to life after school days are over. The understanding of human

nature and of the practical principles of human behavior in the day-to-day dealings with fellow men are essential to happy successful living.''

And since about three-fourths of the students never take a second course in psychology, the authors believe that these fundamental principles should be pointed out in a beginning course and a practical application made of them to real life situations. Otherwise, the authors believe that the students will pigeon-hole their brief academic exposure to pure psychology and will never bring it to bear upon any of the problems of living. Therefore, they have used as a subtitle for this book, ''A First Book in Psychology for College Students,'' and believe that it should be so used rather than as a supplementary text or a text on applied psychology.

I do not disagree with the authors in regard to the most effective use of the book but plan to use it the second semester of the year as a text on applied psychology. As a prerequisite to this course, the first semester will be devoted to a brief course in general psychology, a course stripped of any application of psychology to everyday life. It is true that there will be duplication, since many pages of the present text are devoted to fundamental psychological principles. However, when so little time is given to a course in general psychology, and particularly when the students are so immature, frequently being freshmen, it is well that there be duplication. This textbook, with much of the space being given to application of psychological principles to living, and with the emphasis on controlling human behavior, can be used very effectively, under some circumstances at least, in a second course. Since the authors' point of view is so different from that of the average author of a beginning text, the immature student is not aware of the amount of duplication. The authors, then, it seems to me have been rather successful in producing a book which may be used in either a first or a second course in psychology. The book has this advantage over other texts on applied psychology in that it does not presuppose a certain knowledge of psychology.

There is an introductory chapter on ''Psychology and You,'' in which are cited concrete ways and situations in which psychology can be used in daily living. Following this are twenty-six chapters, fifteen in Part I under the general heading, ''Controlling the Behavior of Self,'' and eleven in Part II under the heading, ''Controlling the Behavior of Others.''

''Part I of this book deals with the drives of human behavior, controlling routine behavior, perception and the sensory mechanism, control through habits, learning how to think, how to remember, how to concentrate for work, how to use one's energies effectively, how to control feelings and emotions, behavior of self in social contacts, behavior of self toward associates in occupations, selection of a vocation, development of personality, and behavior hygiene. It is evident that the behavior of others can be controlled only through one's own behavior.

"Among the obvious problems in Part II are control of behavior of children in the home and in school, vocational and avocational direction, controlling the behavior of subordinates in business, controlling the behavior of abnormals, influencing others through selling, through advertising, through public speech, through music, art, and entertainment, control of public opinion, controlling the behavior of others through religion, and finally, many of the principles of behavior are summarized in the last chapter entitled 'The Art of Living.'"

The applications and concrete illustrations are numerous and, as the authors point out, are taken as far as possible from everyday affairs. Each chapter is followed by many interesting and stimulating questions to help the student in his application of the psychological principles to his own life. I predict that this book will be widely adopted, either as a beginning or as a supplementary text.

THURMAN C. SCOTT,
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NEW BOOKS AND PAMPHLETS

Books and pamphlets for review should be sent to JAMES P. PORTER, *Editor*, JOURNAL OF APPLIED PSYCHOLOGY, Ohio University, Athens, Ohio.

Adjustments of Boys with Impaired Hearing. STEPHEN HABBE. Bureau of Publications, Teachers College, Columbia University, New York, 1936. $1.60.

Blindness and the Blind in the United States. HARRY BEST. Macmillan Company, New York, 1934. $6.50. 714 pp.

California Test of Mental Maturity—Grades 4–8. ELIZABETH T. SULLIVAN, WILLIS W. CLARK, ERNEST W. TIEGS. Southern California School Book Depository, Los Angeles, Calif., $1.25 per pkg. of 25. 16 pp.

Controlling Human Behavior. DANIEL STARCH, HAZEL M. STANTON, WILHELMINE KOERTH. Macmillan Company, New York, 1936. $2.90. 638 pp.

Enjoyment of Laughter. MAX EASTMAN. Simon & Schuster, New York, 1936. $3.75.

An Enquiry into Moral Notions. JOHN LAIRD. University of Columbia Press, New York. $3.25. 318 pp.

Friendship-Love in Adolescence. N. M. IOVETZ-TERESHCHENKO. Messrs. George Allen and Unwin, Ltd., London, 1936. 16 s. 367 p.

A Humane Psychology of Education. Jaime Castiello. Sheed & Ward, New York, 1936. $2.50. 254 pp.

The Individual Criminal. BEN KARPMAN. Nervous and Mental Disease Publishing Company, Washington, D. C., 1936. 317 pp.

Law and the Lawyers. EDWARD S. ROBINSON. Macmillan Company, New York, 1935. 347 pp.

Men, Women, and Jobs. DONALD G. PATERSON AND JOHN G. DARLEY. University of Minnesota Press, 1936. $2.00. 145 pp.

The Methodology of Educational Research. CARTER V. GOOD, A. S. BARR, DOUGLAS E. SCATES. D. Appleton-Century Company, New York, 1936. $3.75. 882 pp.

An Objective Study of Punctuality in Relation to Personality and Achievement. GEORGE J. DUDYCHA. Archives of Psychology, Columbia University, New York, 1936. 53 pp.

Personality: Its Development and Hygiene. WINIFRED V. RICHMOND. Farrar and Rinehart, New York, 1937. 279 pp.

Psychological Studies of Human Variability. WALTER R. MILES, Editor. Psychological Monographs, Vol. XLVII, No. 2. Psychological Review Company, Princeton, N. J. $4.50. 415 pp.

Psychologische Diagnostik Eine Einfuhrung fur Psycholegen und Erzieher. RICHARD MEILI. Verlag von Ernst Reinhardt, Munchen, Germany, 1937. 251 pp.

The Psychology of Social Norms. MUZAFER SHERIF. Harper & Brothers, New York, 1936. $2.00. 209 pp.

Psychometric Methods. J. P. GUILFORD. McGraw-Hill Book Company, New York, 1936. $4.50. 566 pp.

Readings in Educational Psychology. CHARLES E. SKINNER, Editor. Farrar and Rinehart, New York, 1937. $2.25. 630 pp.

Sex and Personality. LEWIS M. TERMAN AND CATHARINE COX MILES. McGraw-Hill Book Company, New York, 1936. 600 pp.

Studies in the Psychology of Art, Vol. II. NORMAN C. MEIER, Editor. Psychological Monographs, Vol. XLVIII, No. 1. Psychological Review Company, Princeton, N. J., 1936. 175 pp.

A Study of Shorthand Teaching. BENJAMIN FRANKLIN DAVIS. Bureau of Publications, Teachers College, Columbia University, New York, 1936. $1.60. 108 pp.

Testing Practice of High-School Teachers. J. MURRAY LEE AND DAVID SEGEL. U. S. Department of Interior, Office of Education, Washington, D. C., 1936. 42 pp.

INDEX OF SUBJECTS

Titles of books are followed by the name of the author of the work reviewed. All other references are to original articles.

Ability, relationship, finger length, hand width, musical, 347.

Achievement, negro boys, mechanical aptitude, 751.

Activities, indications, personal traits, value, reported likes, dislikes, experiences, 285.

Adjustment, mentally deficient boys, measuring institutions, 736.

Adjustment, children, measurement, attitudes, parental control, 359.

Adolescents, test, four personality traits, 527.

Adults, table, percentile, equivalents, eight intelligence tests, 392.

Advertising illustrations, identification, emotions, 748; —, techniques, typical results, effectiveness, appeal, radio, 325.

Age, chronological, mental, rate, piano learning, 511.

American Congress, rural, urban origins, members, 664; —— negro boys, St. Louis public school boys, comparison, IQ's, incarcerated delinquent white and, 499.

Analgesic dosage, aspirin, mental, motor performances, effect, 481.

Anatomy of personality (Fry and Haggard), 422.

Anthropometric measures, manual dexterity, relation, 227.

Appeal, radio advertising, technique, typical results, effectiveness, 325.

Aptitude, school achievement, negro boys, mechanical, 751.

Arrangement, items, rank order, relation, objectivity, validity, 154.

Aspirin, mental, motor performances, effect, analgesic dosage, 481.

Assembly test, practical form, girls mechanical, 672.

Association method, detection, lying, comparison, cardio-pneumo-psychograph, 243.

Attention value, study visual fixation method, measuring, 44.

Attitude, experimental study, changes, 114.

Attitude, feminism, inconsistency, attitudinal behavior, 535; —, parental control, social adjustments, children, measurement, 359; —, sex differences, vocational, 576.

Attitudinal behavior, attitudes, feminism, inconsistency, 535.

Automobile driving, reaction time, 353.

Behavior, attitudes, feminism, inconsistency, attitudinal, 535; —, evaluation, principles, 183.

Belief, fortune telling, college students, prevalence, 488.

Bernreuter personality inventory, new scoring device, 264.

Binet IQ changes, Harvard growth study, Stanford, 236.

Biotypologie et aptitudes scholaires (Langier Ed. Toulouse et D. Weinberg), 172.

Birth order, family size, personality, related, 340.

Block test, reliability, practice effect, O'Connor Wiggly, 591.
Boys, comparison, IQ's, incarcerated delinquent white, American negro, St. Louis public school, 499; ——, measuring institutional adjustment, mentally deficient, 736; ——, mechanical aptitude, school achievement, negro, 751.

Capacities, performance, mental defectives skilled, lace-making, analysis, 567.
Cardio-pneumo-psychograph, association method, detection, lying, comparison, 243.
Changes, attitude, experimental study, 114; ——, Harvard growth study, Stanford Binet IQ, 236.
Characteristics, three tests, predict clerical success, some, 461.
Child psychology (Kanner), 170.
Children and radio programs (Eisenberg), 524.
Children, different cultures, analysis, spontaneous drawings, 689; ——, measurement, attitudes, parental control, social adjustments, 359.
Children's radio programs, effectiveness, 208; —— radio programs, study, mothers' opinions, 416.
Chronological, mental, rate, piano learning, age, 511.
Class, superior undergraduate students, experiment, special, 146.
Clerical success, characteristics, three tests, predict, 461.
Clinical practice, psychographic method, 161; —— psychology, abstracting, clinical re-education techniques, method, training beginners, 609; —— re-education techniques, method, training beginners, clinical psychology, abstracting, 609.
College freshmen, contributory factors, adjustment problem, 60; —— students, common misconceptions, 633; —— students, prevalence, belief, fortune telling, 488.
Competition, experimental study, 1.
Congress, rural, urban origins, members, American, 664.
Content, reader interests, types, newspaper, 471.
Controlling human behavior (Starch, Stanton and Koerth), 794.
Conversation, sex differences, 727.
Correlation, multiple factor method, multiple, 396.
Counseling, scholastic motivation, rôle, faculty, 314.
Cultures, analysis, spontaneous drawings, children, different, 689.

Defectives, skilled, lace-making, analysis, capacities, performance, mental, 567.
Deficient boys, measuring institutional adjustment, mentally, 736.
Delinquent white, American negro boys, St. Louis public school boys, comparison, IQ's, incarcerated, 499.
Detection, lying, comparison, cardio-pneumo-psychograph, association method, 243.
Dexterity, relation, anthropometric measures, manual, 227.
Differences, conversation, sex, 727; ——, vocational attitudes, sex, 576.
Dislikes, experiences, activities, indication, personal traits, value, reported likes, 285.

Dosage, aspirin, mental, motor performances, effect, analgesic, 481.
Drawing, relation, prediction, school success, experiment, 16.
Drawings, children, different cultures, analysis, spontaneous, 689.
Driving, reaction time, automobile, 353.

Educational psychology (Cuff), 794.
Efficiency, employability, senescent, 266.
Emotions, advertising illustrations, identification, 748; ——, personality, blood type, related, intelligence, 785.
Employability, senescent, efficiency, 266.
Engineering graduates, differential interests, 221.
Equivalents, eight intelligence tests, adults, table, percentile, 392.
Examination, traffic offenders, 493.
Experiences, activities, indications, personal traits, value, reported likes, dislikes, 285.

Factor method, multiple correlation, multiple, 396.
Factors, adjustment problem, college freshmen, contributory, 60; —— influencing speed, reading, printing surface, studies, typographical, 128.
Factory, family and woman in the Soviet Union (Kingsbury and Fairchild), 281.
Faculty counseling, scholastic motivation, rôle, 314.
Family size, personality, related, birth order, 340.
Feminism, inconsistency, attitudinal behavior, attitudes toward, 535.
Finger length, hand width, musical ability, relationship, 347.
Fixation method, measuring attention value, study, visual, 44.
Fortune telling, college students, prevalence, belief, 488.
Fraternity, non-fraternity students, hazards, equate, 451.
Freshmen, contributory factors, adjustment problems, college, 60.

Girls mechanical assembly test, practical form, 672.
Graduates, differential interests, engineering, 221.
Growth, a study of Johnny and Jimmy (McGraw), 423.
Growth study, Stanford Binet IQ changes, Harvard, 236.
Guidance, defense, scientific vocational, 586.

Hand width, musical ability, relationship, finger length, 347.
Handedness, theories, 77.
Harvard growth study, Stanford Binet IQ changes, 236.

Imbecile, moron, idiot, 427.
Institutional adjustment, mentally deficient boys, measuring, 736.
Insurance sales personnel, standardized tests, statistical procedures, selection, life, 553.
Intelligence, emotions, personality, blood type, related, 785; —— quotients, incarcerated delinquent white, American negro boys, St. Louis public school boys, comparison, 499; —— testing, interview form, new possibilities, 599; —— tests, adults, table, percentile equivalents, eight, 392; —— tests, weight, scoring, 769.

Interests, engineering graduates, differential, 221; —, types, newspaper content, reader, 471.
Interview form, new possibilities, intelligence testing, 599.
Introduction to animal psychology, the behavior of the rat (Munn), 169.
Inventory, new scoring device, Bernreuter personality, 264.
IQ changes, Harvard growth study, Stanford Binet, 236.

Lace-making, analysis, capacities, performance, mental defectives skilled, 567.
Large scale, testing observations, 249.
Leaders and leadership (Bogardus), 424.
Learning, age, chronological, mental, rate, piano, 511.
Life insurance sales personnel, standardized tests, statistical procedures, selection, 553.
Likes, dislikes, experiences, activities, indications, personal traits, value, reported, 285.
Lying, comparison, cardio-pneumo-psychograph, association method, detection, 243.

Mail, sampling theory, determination, psychological trends, volume, 368.
Manual dexterity, relation, anthropometric measures, 227.
Marksmanship, steadiness, rifle, 680.
Measurement in psychology (Hunt), 793.
Measures, manual dexterity, relation, anthropometric, 227.
Mechanical assembly test, practical form, girls, 672.
Medical specialties, relative social prestige, representative, 659.
Mental defectives skilled, lace-making, analysis, capacities, performance, 567; —, motor performances, effect, analgesic dosage, aspirin, 481; —, rate, piano learning, age, chronological, 511.
Mentally deficient boys, measuring institutional adjustment, 736.
Method, clinical practice, psychographic, 161.
Methodological considerations, studies, typographical factors influencing speed, reading, 132.
Misconceptions, college students, common, 633.
Moron, idiot, imbecile, 427.
Mothers' opinions, children's radio programs, study, 416.
Motivation, rôle, faculty counseling, scholastic, 314.
Motor performances, effect, analgesic dosage, aspirin, mental, 481.
Multiple factor method, multiple correlation, 396.
Musical ability, relationship, finger length, hand width, 347.

Name hurdles, trade, 438.
Negro boys, mechanical aptitude, school achievement, 751; — boys, St. Louis public school boys, comparison, IQ's, incarcerated deliquent white, American, 499.
Negroes, transfer, religious affiliation, urban, 93.
Newspaper content, reader interests, types, 471.

Non-fraternity students, hazards, equate fraternity, 451.

Objectivity, validity, arrangement, items in rank order, relation, 154.
Observations, large-scale testing, 249.
Occupational history, transients, abilities, 105.
O'Connor Wiggly block test, reliability, practice effect, 591.
Offenders, examination, traffic, 493.
Order, family size, personality, related, birth, 340; —, relation, objectivity, validity, arrangement, items, rank, 154.
Origins, members, American congress, rural, urban, 664.

Parental control, social adjustments, children, measurement, attitudes toward, 359.
Percentile equivalents, eight intelligence tests, adults, table, 392.
Performance, mental defectives skilled, lace-making, analysis, capacities, 567.
Performances, effect, analgesic dosage, aspirin, mental, motor, 481.
Personal reports, waivers, signature, 442; — traits, value, reported likes, dislikes, experiences, activities, indications, 285.
Personality adjustment and domestic discord (Mowrer), 279.
Personality, blood type, related, intelligence, emotions, 785; — inventory, new scoring device, Bernreuter, 264; — traits, adolescents, test, four, 527.
Personnel, standardized tests, statistical procedures, selection, life insurance sales, 553.
Piano learning, age chronological, mental, rate, 511.
Practice effect, O'Connor Wiggly block test, reliability, 591; —, psychographic method, clinical, 161.
Prediction, school success, experiment, drawing, 16.
Preferences, students, orchestral type, 778.
Prestige, representative medical specialties, relative social, 659.
Principles, behavior, evaluation, 183.
Principles of Gestalt psychology (Koffka), 623.
Printing surface, studies, typographical factors influencing speed, reading, 128.
Problem, college freshmen, contributory factors, adjustment, 60.
Problems of self-discovery and self-direction (Bennett and Hand), 523.
Program, method, measuring, sales influence, radio, 175.
Programs, effectiveness, children's radio, 208.
Propaganda, its psychology and technique (Doob), 520.
Psychograph, association method, detection, lying, comparison, cardio-pneumo-, 243.
Psychological trends, volume mail, sampling theory, used in determination, 368.
Psychologists judge fifty-three vocational tests, American, 761.
Psychology, abstracting, clinical re-education techniques, method, training beginners, clinical, 609.
Psychology for executives (Smith), 168.

Psychology in business and in industry (Jenkins), 171.
Psychology of adjustment (Shaffer), 422.
Psychology of pleasantness and unpleasantness (Bebe-Center), 276.
Public school boys, comparison, IQ's, incarcerated delinquent white, American negro boys, St. Louis, 499.

Quotients, incarcerated delinquent white, American negro boys, St. Louis public school boys, comparison, intelligence, 499.

Radio advertising technique, typical results, effectiveness, appeal, 325; —— program, method, measuring sales influence, 175; —— programs, effectiveness, children's, 208; —— programs, study, mothers' opinions, children's, 416.
Rank order, relation, objectivity, validity, arrangement, items, 154.
Rate, piano learning, age, chronological, mental, 511.
Reading, printing surface, studies, typographical factors influencing speed, 128.
Re-education techniques, method, training beginners, clinical psychology, abstracting, clinical, 609.
Religious affiliation, urban negroes, transfer, 93.
Reports, waiver, signature, personal, 442.
Rifle marksmanship, steadiness, 680.

Sales influence, radio program, method, measuring, 175; —— personnel, standardized tests, statistical procedures, selection, life insurance, 553.
Scholastic motivation, rôle, faculty counseling, 314.
School achievement, negro boys, mechanical aptitude, 751; —— boys, comparison, IQ's, incarcerated delinquent white, American negro boys, St. Louis public, 499; —— success, experiment, drawing, prediction, 16.
Scientific vocational guidance, defense, 586.
Scoring device, Bernreuter personality inventory, new, 264.
Selection, life insurance sales personnel, standardized tests, statistical procedures, 553.
Signature, personal reports, waiver, 442.
Social adjustments, children, measurement, attitudes, parental control, 359; —— prestige, representative medical specialties, relative, 659.
Social worker in the prevention and treatment of delinquency (Williamson), 424.
Some parent-child relationships as shown in clinical case studies (Fitz-Simmons), 276.
Special class, superior undergraduate students, experiment, 146.
Specialties, relative social prestige, representative medical, 659.
Speed, reading, printing surface, studies, typographical factors influencing, 128.
Spontaneous drawings, children, different cultures, analysis, 689.
Stability, transient, emotional, 193.
Stanford Binet vocabulary test, note, 258.

Statistical procedures, selection, life insurance sales personnel, standardized tests, 553.
Students, common misconceptions, college, 633; —, experiment, special class, superior undergraduate, 146; —, hazards, equate fraternity, non-fraternity, 451; —, orchestral type preferences, 778; —, prevalence, belief, fortune telling, college, 488.
Study, competition, experimental, 1; —, mothers' opinions, children's radio programs, 416; —, Stanford Binet IQ changes, Harvard growth, 236.
Success, characteristics, three tests, predict clerical, 461; —, experiment, drawing, prediction, school, 16.
Superior, undergraduate students, experiment, special class, 146.
Surface, studies, typographical factors influencing speed, reading, printing, 128.

Test, note, Stanford-Binet vocabulary, 258; —, practical form, girls mechanical assembly, 672; —, reliability, practice effect, O'Connor Wiggly Block, 591.
Testing, interview form, new possibilities, intelligence, 599; —, observation, large-scale, 249.
Tests, adults, table, percentile equivalents, eight intelligence, 392; —, American psychologists judge fifty-three vocational, 761; —, predict clerical success, characteristics, three, 461; —, statistical procedures, selection, life insurance sales personnel, standardized, 553; —, weight, scoring intelligence, 769.
Theory, psychological trends, volume mail, sampling, 368.
Time, automobile driving, reaction, 353.
Traffic offenders, examination, 493.
Training beginners, clinical psychology, abstracting, clinical reeducation techniques, method, 609.
Trait-names: psycho-lexical study (Allport and Odbert), 522.
Traits, adolescents, test, four personality, 527; —, value, reported likes, dislikes, experiences, activities, indications, personal, 285.
Transient, emotional stability, 193.
Transients, abilities, occupational history, 105.
Trends, volume mail, sampling theory, determination, psychological, 368.
Type preferences, students orchestral, 778; —, related, intelligence, emotions, personality, blood, 785.
Types, newspaper content, reader interests, 471.
Typographical factors influencing speed, reading, printing surface, studies, 128.

Urban negroes, transfer, religious affiliation, 93; — origins, members, American congress, rural, 664.
Undergraduate students, experiment, special class, superior, 146.

Validity, arrangement, items, rank order, relation, objectivity, 154.

Visual fixation method, measuring attention value, study, 44.
Vocabulary test, note, Stanford-Binet, 258.
Vocational attitudes, sex differences, 576; —— guidance, defense, scientific, 586; —— tests, American psychologists judge fifty-three, 761.
Weight, scoring intelligence tests, 769.
White, American negro boys, St. Louis public school boys, comparison, IQ's, incarcerated delinquent, 499.
Wiggly block test, reliability, practice effect, O'Connor, 591.

INDEX OF AUTHORS

The names of authors of original contributions are printed in Capitals and Small Capitals.

ANASTASI, ANNE, 689.
Anderson, Amos C., 171, 793.
BERGEN, GARRET L., 249.
BRENTLINGER, W. H., 105, 193.
BRILL, MOSHE, 736.
BROWN, LAURA MAE, 396.
BROWN, ROBERTA W., 511.
BURR, EMILY T., 672.
Burtt, Harold E., 169, 172, 283, 425, 522, 630.
BUXTON, C. E., 680.
CANTY, ALAN, 493.
CARLSON, J. SPENCER, 727.
CHARLES, C. M., 499.
CONWAY, CLIFFORD B., 264.
COOK, STUART W., 727.
COOPER, CHARLES L., 751.
COPELAND, HERMAN A., 461.
CRAWLEY, S. L., 93.
CRIDER, BLAKE, 748.
CUFF, NOEL B., 769.
DAVIS, R. C., 481.
DIMMICK, GRAHAM B., 221.
DISERENS, C. M., 488.
DOLL, EDGAR A., 427.
Edds, Jess H., 794.
EMME, EARLE E., 60.
FOLEY, JOHN P., 689.
GASKILL, HAROLD V., 325.
Gentry, J. R., 524.
GERBERICH, J. R., 471.
GILBERT, JEANNE G., 266.
GREENSHIELDS, BRUCE D., 353.
GRIFFITTS, C. H., 227.
GUILFORD, J. P., 44.
HACKMAN, R. B., 44.
HARTKEMEIER, HARRY PELLE, 396.
HARTMANN, GEORGE W., 628, 659.
HOLCOMB, RICHARD L., 325.
HUMPHREYS, LLOYD G., 680.
HUSBAND, RICHARD W., 586.
KATZOFF, E. T., 340.
KINDER, ELAINE F., 567.
KIRKPATRICK, CLIFFORD, 535.
KNOWER, FRANKLIN H., 114.
LEHMAN, HARVEY C., 451, 576.
LIKERT, RENSIS, 175.
LINCOLN, EDWARD A., 236.
LINK, HENRY C., 527.
LONGSTAFF, H. P., 208, 416, 438.
LORGE, IRVING, 392.
Louttit, C. M., 171, 276, 424, 525.
MAHAN, HARRY C., 258.
MAIZLISH, I. L., 599.
METCALFE, ZAIDA, 672.
MORGAN, CLELLAN L., 146.
OLSON, WILLARD C., 442.
PALLISTER, HELEN, 761.
PATERSON, DONALD G., 128, 132.
Patrick, James R., 170, 279.
PECK, LEIGH, 16.
POULL, LOUISE E., 161.
REMMERS, H. H., 591.
ROOS, MARY M., 368.
SCHILLER, AVNER, 77.
SCHULTZ, RICHARD S., 553.
Scott Thurman C., 796.
SIBLEY, ANNIE BELL, 609.
SMITH, FRANCIS F., 154.
SMITH, J. M., 591.
SMITH, MAPHEUS, 664.
STAGNER, ROSS, 281, 340, 423, 523.
STARCH, DANIEL, 183.
STOGDILL, EMILY L., 609.
STOGDILL, RALPH M., 359.
STROMBURG, ELEROY, L., 727.
TAFT, GEORGIANA C., 567.

TAYLOR, H. R., 680.
TAYLOR, JAMES H., 347.
THALHEIMER, J. A., 471.
THOMPSON, GEORGE N., 785.
THORNDIKE, EDWARD L., 285.
THORPE, LOUIS P., 778.
TINKER, MILES A., 128, 132.
VALENTINE, W. L., 633.
VAUGHN, JAMES, 1.
WILLIAMSON, E. G., 314.
WINTER, JOHN E., 243.
WITMER, LOUISE, 258.
WITTY, PAUL A., 576.
WOOD, T. W., 488.

Directory of American Psychological Periodicals

(Continued)

Comparative Psychology Monographs—Baltimore: Johns Hopkins University Press. Subscription $5.00. 400 pages per volume. Knight Dunlap, Managing Editor. Published without fixed dates, each number a single research. Founded 1922.

Genetic Psychology Monographs—Worcester, Mass.: Clark University Press. Subscription $7.00 per volume. One volume per year. Edited by Carl Murchison. Bi-monthly. Each number one complete research. Child behavior, animal behavior and comparative psychology. Founded 1925.

Psychological Abstracts—Eno Hall, Princeton, N. J.: American Psychological Association. Subscription $6.00. 700 pages ann. Edited by W. S. Hunter and E. R. Willoughby. Monthly. Abstracts of psychological literature. Founded 1927.

Pedagogical Seminary and Journal of Genetic Psychology—Worcester, Mass.: Clark University Press. Subscription $14.00 per annum; $7.00 per volume. 1,000 pages annually (2 volumes). Edited by Carl Murchison and an international cooperating board. Quarterly. Child behavior, animal behavior, and comparative psychology. Founded 1891.

Journal of Social Psychology—Worcester, Mass.: Clark University Press. Subscription $7.00. 500–600 pages annually. Edited by John Dewey and Carl Murchison. Quarterly. Political, racial, and differential psychology. Founded 1929.

Personnel Journal—Baltimore: The Williams & Wilkins Co. Subscription $5.00. 500 pages, approximately. Edited by Walter V. Bingham. Bi-monthly.

Mental Measurement Monographs—Baltimore: The Williams & Wilkins Company. Subscription $5.00. 400 pages annually. Edited by Knight Dunlap and Buford Johnson. Published without fixed dates, each number a single research. Founded 1925.

Studies in Psychology and Psychiatry—Baltimore: The Williams & Wilkins Company. Subscription $5.00. 400 pages annually. Edited by Edward A. Pace. Published without fixed dates, each number a single research. Founded 1926.

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Child Development—Baltimore, Md.: Williams & Wilkins Company. Subscription $5.00. 400 pages annually. Edited by Buford Johnson. Quarterly. Founded 1930.

Character and Personality—Durham, N. C.: Duke University Press. Subscription $2.00 per annum. Quarterly. Edited by Robert Saudek (London) and Ernest Berman (Durham, N. C.). Founded 1932.

The Psychological Exchange—11 East 125th Street, New York, N. Y. Subscription $3.00 per annum. Bi-monthly. Edited by James Hargan. Founded 1932.

Directory of American Psychological Periodicals

American Journal of Psychology—Ithaca, N. Y.: Cornell University. Subscription $5.50. 624 pages annually. Edited by E. M. Dallenbach, M. F. Washburn, M. Bentley, E. G. Boring. Quarterly. General and experimental psychology. Founded 1887.

Journal of General Psychology—Worcester, Mass.: Clark University Press. Subscription $14.00 per annum; $7.50 per volume. 1,000 pages annually (2 volumes). Edited by Carl Murchison and an international cooperating board. Quarterly. Experimental, theoretical, clinical, and historical psychology. Founded 1928.

Psychological Review—Princeton, N. J.: Psychological Review Company. Subscription $5.00. 540 pages annually. Bi-monthly. General Psychology. Edited by Herbert S. Langfeld. Founded 1894.

Psychological Monograph—Princeton, N. J.: Psychological Review Company. Subscription $6.00 per vol. 500 pp. Ed. by Joseph Peterson. Published without fixed dates, each issue one or more researches. Founded 1895.

Psychological Index—Princeton, N. J.: Psychological Review Company. Subscription $2.50. 300-400 pp. Edited by W. S. Hunter and R. R. Willoughby. An annual bibliography of psychological literature. Founded 1895.

Psychological Bulletin—Princeton, N. J.: Psychological Review Company. Subscription $6.00. 720 pages annually. Psychological literature. Monthly (10 numbers). Edited by John A. McGeoch. Founded 1904.

Archives of Psychology—New York: Columbia University. Subscription $6.00. 500 pp. ann. Ed. by R. S. Woodworth. Published without fixed dates, each number a single experimental study. Founded 1906.

Journal of Abnormal and Social Psychology—Psio Hall, Princeton, N. J. American Psychological Association. Subscription $5.00. Foreign, $5.25. Editor, Harry P. Moore. Quarterly. 448 pages annually. Abnormal and Social. Founded 1906.

Psychological Clinic—Philadelphia: Psychological Clinic Press. Subscription $2.00. 350 pages. Ed. by Lightner Witmer. Without fixed dates (Quarterly). Orthogenics, psychology, hygiene. Founded 1907.

Psychoanalytic Review—Washington, D. C.: 3617 19th St., N.W. Subscription $3.00. 500 pages annually. Psychoanalysis. Quarterly. Ed. by W. A. White and S. E. Jelliffe. Founded 1913.

Journal of Experimental Psychology—Princeton, N. J. Psychological Review Company. 600 pages annually. Experimental. Subscription $7.00. Bi-monthly. Edited by S. W. Fernberger. Founded 1916.

Journal of Applied Psychology—Lancaster, Pa.: Science Press Printing Co. Subscription $5.00. 500 pages annually. Bi-monthly. Edited by James P. Porter, Ohio University, Athens, Ohio. Founded 1917.

Journal of Comparative Psychology—Baltimore: The Williams & Wilkins Co. Subscription $6.00 per volume of 450 pages. Two volumes every year. Edited by Knight Dunlap and Robert M. Yerkes. Founded 1921.

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